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Agricultural Outlook Forum '97

Speech Booklet 1

Session, Title and Speaker

Risk Management For U.S. Agriculture

Risk Management In American Agriculture

B. H. Robinson, Administrator, Cooperative State Research, Education, and Extension Service, USDA

Alternatives for Producer Risk Management

Joy Harwood, Dick Heifner, Keith Coble, and Janet Perry, Agricultural Economists, Economic Research Service, USDA

New Risk Management Insurance Tools

Ken Ackerman, Acting Administrator, Risk Management Agency, USDA

Risk Management from a Producer's Point of View

John C. Kintzle, Iowa Corn and Soybean Producer

Market Stability and World Food Security

Market Stability and World Food Security: What Do Importers Face?

David Blandford, Economist in the Directorate for Food, Agriculture and Fisheries, Organization for Economic Cooperation and Development

Grains and Oilseeds Forum

A Producer's Perspective on Changing Farm Programs

Alan Karkosh, K&O Forms, Inc.

Livestock and Poultry Forum

Are Consumers Getting What They Want?

Kevin Bost, Commodities Analyst, Topco Associates, Inc.

Cotton Forum

The Cotton Marketing Challenge

O.A. Cleveland, PhD, Marketing Specialist, Mississippi State University



....Contents Continue

Session, Title and Speaker, Continued

The Consumer Price Index For Food

The Outlook for Food Prices in 1997

Annette L. Clauson, Agricultural Economist, Economic Research Service, USDA

Evaluation of USDA's Forecasts for the CPI for Food, an Initial Assessment

Mark Denbaly, Branch Chief, Economic Research Service, USDA

Consumer Price Index Overstates Food Price Inflation

James M. MacDonald, Economist, Economic Research Service, USDA

Grains and Oilseeds Luncheon

The Choices Facing the European Community in the Light of the Progress Towards More Open Markets

D. F. Roberts, Deputy Director General, European Commission

RISK MANAGEMENT IN AMERICAN AGRICULTURE

Remarks by
B.H. Robinson, Administrator
Cooperative State Research, Education,
and Extension Service

Good afternoon, and welcome to the USDA's Agricultural Outlook Forum. It is my pleasure to moderate this session on Risk Management in American Agriculture. I come here as a strong supporter of programs to deal with change, risk, and the new order in agriculture. Change is the name of the game in agriculture these days. Not surprisingly, much of that change means more and different risk for U.S. farmers and ranchers. Managing that risk concerns them greatly.

That is why we are here today: to consider how we can together address the many new and different risks farmers and ranchers face, especially in a climate much more free-form and market oriented. Partnership is a must. We do our best when in partnership with experts such as those in USDA's Risk Management Agency, the Commodity Futures Trading Commission, with industry, and, of course, with farmers and ranchers and their organizations.

Recently, speaking about the formation of the new USDA Risk Management Agency, Secretary Glickman stated that the "U.S. Department of Agriculture needs to step up our farmer education efforts in the whole area of risk management." Risk management is one of the issues that Secretary Glickman has raised as a critical issue.

The declining government commodity program "safety-net" is now an accepted fact. The FAIR Act set that process in motion. Although FAIR is a major influence, it is not the only contributor to risks farmers face. We need to think about risk in broad terms. Major shifts are occurring not only in government commodity programs, but also through the process of the industrialization of agriculture and of reorganization, concentration, and globalization of markets. Changes in technology, environmental and health concerns, and rapid spread of

pests and disease are other essential factors to consider. Producers respond to these changes in many ways. They are experimenting with new enterprises, finding new ways of doing business; using new technologies and practices; making new financial and other commitments. In the process, they are changing the character of old risks and creating new ones, and, developing new management strategies.

Because we cannot predict future events with certainty, no one can eliminate all risk. Moreover, it would not be desirable to do so, because profits are a return to risk taking: "nothing ventured; nothing gained." Successful farm and ranch management depends on taking risk consistent with the goals and financial position of the individual business. Producers and other agricultural firms need to reconsider their risk management portfolios continually, not just once in a while. In doing so, they must rely on a logical process to identify risks, assess these risks' importance, evaluate alternatives, and implement what alternatives they select.

Our purpose today is to explore some emerging tools available to help manage agricultural risk. We'll look at some tools and their use - not as the final answer, but as a beginning dialogue between researchers, the government agencies that provide some of the tools and that regulate the use of others, the private sector providers of the tools, and most importantly, with the farmers, ranchers, and merchants who must rely on their use. We have assembled a distinguished panel, well qualified to address the topic.

Let me briefly provide some background for what we'll discuss during this session. While risk protection from government commodity programs is declining, many risk management tools within the private sector, including crop insurance and various marketing strategies, have expanded their usefulness to producers. Coverage options for crop insurance have increased. Other strategies, such as irrigation, land leasing, and use of custom operations also reduce the operator's risk. Spreading product sales over the year, followed by contracting the sale of production, continue to be widely used techniques.

New and often complex risk management tools -- federally subsidized revenue insurance, futures derivatives, and hybrid cash contracts -- are being added to the portfolio of alternatives available to agricultural producers. Crop revenue

coverage, income protection, and revenue assurance are being offered on a pilot basis.

The FAIR Act renewed interest in the agricultural risk environment and in alternate ways to mitigate risk. The amount of attention focused on the risk dimensions of farm and ranch management decisions today reflects the demand for information and educational assistance in this area: this is indeed a teachable moment.

The increasing number of alternatives for managing income risk leads us to questions about their effectiveness and how they can best be combined to meet specific commodity or geographic needs. Examples have shown that combining crop insurance and forward contracting can, when properly used, reduce risk over the growing season substantially. Revenue insurance can be effective in reducing revenue risk. But, alone or in combination, the tools must be carefully chosen and tested to meet individual producers' needs.

We need to address risk management within the context of total firm management. The new Cooperative State Research, Education, and Extension Service and Land Grant University System initiative called Managing Change in Agriculture focuses on risk management and marketing as one of three priority program areas. Ongoing and envisioned programs will help producers develop and implement business procedures to anticipate and manage risks inherent in their environment and take advantage of marketing opportunities. The purpose is to assist decision makers in developing production, marketing, and financial risk management skills, and to use them to choose alternatives and develop strategies for their business and marketing plans.

What is our context for engaging in risk analysis and risk education? Clearly, risk management is not the end goal; our objective is not to help people reduce or eliminate risk. Remember that profits are a return to risk taking. But risk management needs to fit within the broader context of how people establish personal and family goals and the complex alternatives they must evaluate as they seek to accomplish those goals.

What will we see from this expanded risk management efforts? I predict a more competitive agricultural sector able to manage variability in yield, price, policy,

regulations, legal, human, financial, health and other factors that represent risks to the agricultural sector. I also see new successful working relationships that will better meet the research and education needs of U.S. agriculture and the public.

It is clear that the time is here for risk management. I am encouraged by your presence at today's session. Together, we can prepare and implement effective risk management programs grounded in the solid research, sound policy, and the development of appropriate and useful tools and strategies. We can help equip and fortify American farmers and ranchers and their families to face with agility and strength the formidable challenge of change in contemporary agriculture.

ALTERNATIVES FOR PRODUCER RISK MANAGEMENT

by

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Market and price volatility have long been a hallmark of the agricultural sector. When aggregate output or demand changes sharply, farm-level prices can fluctuate wildly. U.S. agricultural policies for major field crops have attempted to mitigate the risks farmers face from variations in crop yields and prices, and to help farmers manage these risks.

The form those policies have taken has, however, changed dramatically over time. The 1996 Farm Act has altered the government's role in providing support to producers, and has renewed interest in the agricultural risk environment and alternative ways to mitigate risk. Meanwhile, relatively new risk management tools--federally subsidized revenue insurance, yield futures and options, and hybrid cash contracts--add to the alternatives available to producers.

These developments raise several questions: How has the risk environment faced by producers changed over time, particularly with passage of the 1996 Farm Act? What are some of the new risk management tools available to producers? How effective are they in reducing farm-level income risk? This paper examines these questions, focusing on the risk environment faced by producers of major grain crops.

What Does the New Environment Mean for Income Risk?

The 1996 Farm Act dismantled the complex system of deficiency payments and annual supply management programs that were in place since 1973, affecting expected returns and the income risk confronted by grain producers. The "old" system provided program crop producers with price and income support in years of low market prices. In contrast, participating producers under the 1996 Act will receive "contract payments" that are fixed in the aggregate for each of the years 1996-2002, and that are at relatively high levels when compared to projected payments had the deficiency payment system been continued. Because contract payments do not increase when prices are low--a major feature of previous commodity programs--they do not, however, directly reduce farmers' income risks.

Under the pre-1996 program, payments were made during times of low market prices. That system not only raised farmers' incomes on average, but also provided a degree of protection against low incomes. Research conducted by USDA's Economic Research Service (ERS) and Ohio State University, based on conditions and program parameters in effect in 1992 and accounting for a wide range of weather shocks, indicates that simulated market returns for U.S. corn producers averaged about \$270 per acre. Deficiency payments would add \$50 per acre, on average, in income support.

In addition, deficiency payments tended to stabilize revenues by transferring income to producers when national average market prices were low. According to these research results, deficiency payments reduced revenue risk by an average of 20 percent for U.S. corn producers. Because deficiency payments were made when national average prices for program crops were low--and not necessarily when the revenue for an individual farm was low--this system was far from totally effective. In fact, year-to-year revenue risk was not dampened significantly for certain individual farms, and not at all in other cases--particularly for those farms in areas where yields and prices exhibit a strong inverse relationship, creating a "natural hedge" that works to stabilize revenues through market forces.

In contrast to the risk effects associated with deficiency payments, the new contract payments do not reduce revenue variability for producers in any situation. This is because they are not based on current prices or yields. In 1998, for example, a participating corn producer is projected to receive a contract payment averaging to about \$32 per acre, regardless of actual price levels in that year. As a result, the revenue variability faced by producers who receive contract payments is essentially identical to the variability they confront if they depend only on market returns.

Although contract payments do not provide protection against income risk, it is important to note that they offer substantial income support. Contract payments over the 1996-2002 are projected to be significantly higher than payments had the deficiency payment program been continued, totaling to more than \$35 billion over the seven years.

....And For Price Risk?

Although income variability likely will be higher for most grain and cotton growers due to the absence of deficiency payments under the 1996 Farm Act, it remains unclear whether and by how much price variability will change. Under the 1996 Act, output and price depend entirely on the market--USDA will no longer implement acreage reduction and other supply management programs. The net effect on price variability remains unclear, and depends on many factors.

For example, the aggregate effect of the increased planting flexibility associated with the 1996 Farm Act on the volatility of crop prices is uncertain. Before 1996, participating producers' planting decisions were limited by base acreage constraints, acreage reduction programs (ARPs), and other provisions. With the 1996 Act, however, farmers now have nearly total freedom to

plant a wide variety of crops on any of their land, and ARPs have been eliminated. As a result, planting decisions are affected by the expected prices and yields that farmers envision at planting time, relative costs, rotational concerns, management abilities, available equipment, and weather conditions at planting time.

The effect of this increased planting flexibility on the volatility of crop prices (and hence farm revenues) depends on producer behavior and aggregate supply response. If year-to-year planting adjustments are significantly greater than in the past, prices and revenues may be more volatile. On the other hand, volatility may be reduced if farmers can more readily respond to market signals, without the planting restrictions that may have constrained acreage shifts in the past.

Changes introduced with the 1996 Farm Act are part of an evolution to more market-oriented policies that began with the 1985 Farm Act, and many program changes that have occurred over time have implications for variability. During the early 1980's, government loan rates (the price per unit for commodity loans to participating farmers) were set at high levels, establishing a floor under market prices and encouraging forfeiture of crops into government stocks in lieu of loan repayment. The 1985 Act reduced loan rates, increasing the role of marketplace signals and reducing government intervention and stockholding. The 1996 Farm Act capped commodity loan rates at 1995 levels and marketing loan provisions are in place--both of which reduce the likelihood that loan rates will interfere with market prices.

Other developments have also affected the risk environment, particularly the tightening of world grain stocks. This situation is the result of rising demand outpacing production, as well as policies in the U.S. and elsewhere aimed at reducing government-held stocks. The global stocks-to-use levels for corn and wheat in 1995/96 fell to the lowest level in the USDA data base that starts in 1960. If low global stock levels persist, prices (and revenues) will likely be more volatile than if higher stocks were available to buffer year-to-year supply and demand shocks.

Some changes in the risk environment may be partially offsetting. Reduction in trade barriers, including passage of the Uruguay Round Agreement and the North American Free Trade Agreement, has enhanced world market integration and agricultural trade potential. The ability to ship more goods from areas of commodity surplus to deficit regions may work to dampen market volatility and reduce price variability in future years.

In short, substantial uncertainty remains regarding the price risks faced by producers. However, with the absence of downside price protection provided by deficiency payments--and the current system of fixed, declining contract payments--revenue variability will likely increase. And, of course, any increases or decreases in price variability--an empirical question to be measured over time--will have implications for the variability in farm-level revenues as well.

Farmers Use a Variety of Tools

Within the changing risk environment, many traditional risk management tools continue to be useful to farmers, including crop insurance and various production and marketing strategies. Certainly, income risk is nothing new to farmers, and many have used a wide variety of tools--including Government programs, diversification, and various forward sales strategies--for some time.

Federal crop insurance, for example, which underwent extensive reform in 1994, has been available to producers of program crops (and various specialty crops) since at least 1980, and for some crops and areas as early as 1938. At the catastrophic level (CAT), producers pay a \$50-per-crop fee for coverage against yield losses of greater than 50 percent of the farm's expected yield. CAT can be purchased through private insurance companies and, in some locations, through Farm Service Agency offices. Producers can increase coverage up to 75 percent of their expected yield by paying a premium. This additional coverage is available only through private companies. USDA subsidizes Federal crop insurance policies and reinsurance (shares the losses and gains) with the company writing the policy to the producer.

USDA's 1993 Farm Costs and Returns Survey (FCRS) included several questions that probed farmers' use of alternative risk strategies. Two categories were used to summarize farmers' responses: production strategies (such as Government programs, crop insurance, and diversification), and marketing strategies (such as forward contracting, hedging, and spreading sales throughout the year).

According to the results, more than half of the farmers surveyed used government programs and about 25 percent used crop insurance in 1993 (Figure 1). The survey found that the use of government programs and crop insurance was especially important for operators of cash grain farms in the Northern Plains and the western Corn Belt. Other strategies such as leasing land and using custom labor were more likely to be chosen by farmers in the Southeast and in the West. These latter strategies are risk-reducing because they allow producers to expand their operations without taking on an added mortgage or fixed equipment costs. In general, large farms appear to use diversification, leased land and equipment, and the contracting of inputs more commonly than do smaller farms.

The survey indicated that the most popular marketing strategy among U.S. farmers in 1993 was spreading sales over the year, followed by contracting the sale of farm production (Figure 2). The latter technique establishes a pre-harvest selling price and guarantees an outlet for the commodity. A less popular strategy was hedging, a process whereby the farmer uses the futures market to establish a pre-harvest price for his or her crop. To successfully implement a hedging strategy, cash or credit is required to begin and maintain the hedging process, which may limit its use.

Large farm operators are most likely to use marketing strategies to manage their risks, and farmers in the Northern Plains are much more likely to use such strategies than those in the Southeast. Farmers in the Northern Plains typically have less diversified operations than those in the Southeast, which may explain this geographic pattern. Also, farms in the Northern Plains tend to be larger, as measured by sales volume, than those in the Southeast.

New Products Help Farmers Manage Risks

In the spring of 1996, two pilot revenue insurance programs were introduced to complement the traditional risk management tools discussed above. Income Protection (IP) was developed by USDA's Risk Management Agency in response to a mandate in the Federal Crop Insurance Reform Act of 1994, while Crop Revenue Coverage (CRC) was designed by a private insurance company. These programs have expanded to new geographic areas over the past year, and a new product--Revenue Assurance (RA)--will be offered in the spring of 1997 in selected areas and for selected crops. Each product is based on the concept of combining price and yield risk protection in one program that provides downside revenue risk protection to producers.

IP offers a "revenue guarantee" based on the total acreage planted by a producer, the sign-up time futures price for harvest-time delivery, and the farmer's expected yield. The farmer receives an indemnity if the harvest-time price, multiplied by the farm's actual yield in that year, falls below the guarantee. Because the guarantee is based on the early-season price projection for harvest-time, IP protects against shortfalls in actual revenue below the expected revenue for the particular season. This policy, similar to CRC and RA, also provides a measure of inter-year stability because sign-up time futures prices for harvest-time delivery are less variable than harvest-time prices. IP premium costs are lower than for traditional crop insurance, especially in areas with high yield-price correlation.

CRC contains two components. The first, similar to IP, offers a revenue guarantee based on price expectations and farmers' expected yields. The second component offers "replacement coverage," whereby coverage can increase during the season if prices rise. If a producer has a short crop and the price is higher at harvest than the pre-harvest projection, the producer's crop yield loss is indemnified at the higher harvest-time price, allowing him or her to buy "replacement" bushels in the marketplace. The producer receives the higher of the "revenue guarantee indemnity" or the "replacement coverage" indemnity. Because of the added costs of replacement coverage, as well as other features, CRC premiums are much higher, on average, than IP premiums.

Revenue Assurance contains only one component--the revenue guarantee--making it more similar to IP than to CRC. However, RA and IP differ in important ways. RA embeds a unique system of premium discounts that depend on the unit structure associated with the farm. In contrast, IP allows producers to insure at only the enterprise unit level (all acreage in a crop in a

county is combined into one parcel), while CRC provides for both basic and optional acreage division.

As with Federal crop insurance, USDA subsidizes and reinsurance revenue insurance policies that are approved by the Federal Crop Insurance Corporation Board of Directors. Premiums vary by the coverage level selected (options range up to 75 percent yield coverage), and policies are then sold to producers by private companies. The geographic areas eligible for coverage have expanded considerably over the past year:

- *Income Protection*--IP was offered for corn, cotton, and spring wheat in 29 counties in the spring of 1996, and for winter wheat in 18 counties in the fall of 1996. For the spring of 1997, the FCIC Board approved IP expansion into soybeans (56 counties) and grain sorghum (24 counties).
- *Crop Revenue Coverage*--CRC was offered for corn and soybeans in all Iowa and Nebraska counties in the spring of 1996, as well as for winter wheat in six states (and selected counties in Montana) in the fall of 1996. Beginning in the spring of 1997, CRC is available for cotton, grain sorghum, and spring wheat in selected counties, and geographical coverage for corn and soybeans has been expanded significantly.
- *Revenue Assurance*--RA policies were approved for sale for corn and soybeans in all counties in Iowa for 1997. This is the first offering of the RA product.

Experience data show considerable variation in participation rates depending on the crop and the area. About 90,000 CRC policies were sold in Iowa and Nebraska in 1996, and about one-third of the Federally-subsidized crop insurance policies in those states were CRC policies. CRC covered about one-third of all corn and soybean planted acreage in the two states, and the liability for CRC and MPCi sales were nearly identical (Table 1).

In contrast, about 10 percent of all Federally subsidized winter wheat policies in states where CRC was available were CRC sales--a substantial drop compared to spring-crop experience (Table 2). Some argue that lower winter wheat sales were due to the relative premium rate increase on CRC winter wheat policies when compared to corn and soybeans. Some observers also indicate that corn and soybean producers may have been in a better financial position in 1996 to pay the CRC premium than were winter wheat producers. The impact of lower commodity prices in 1997 on CRC sales remains to be seen.

In addition to these revenue insurance products, new forward contracting arrangements have also developed. Farmers have long been able to lock in a price for a given quantity well ahead of harvest by forward contracting with a local elevator. New types of contracts provide farmers with greater flexibility in managing risks, but some, particularly hedge-to-arrive contracts, are

often difficult to understand, and have led in some cases to legal disputes between farmers and buyers.

In addition, the Chicago Board of Trade has introduced yield futures contracts for selected states and crops. When combined with price futures (or options), the yield contract can substantially reduce revenue risk in many areas. Farms and businesses--including grain companies and insurance companies--have expressed an interest in these contracts, but trading volume has been low. Basis risk (uncertainty about the difference between a farm's yield and the state yield on which the contract trades) is a major obstacle to direct hedging in yield futures by farmers.

How Effective Are Various Risk Management Tools?

The many options available for managing income risk lead to questions about their effectiveness and about how they can best be combined, and particularly, their relative effectiveness in different regions. To address these questions, ERS examined four risk management strategies--forward selling a portion of expected output (for example, through a futures hedge); purchasing crop insurance at the 75-percent coverage level; combining crop insurance and a forward sale; and purchasing revenue insurance at the 75-percent coverage level (based on the harvest-time futures price). Although there are many ways in which risk can be measured, the approach used here assumes a "safety first" criteria, where risk is measured as the probability of revenue falling below 70 percent of expected revenue.

In making the comparisons, we focused on risk and did not estimate the effects of the different strategies on average revenues. Forward selling generally has little effect on average revenues, but with government subsidies, crop and revenue insurance increase average revenues for most farmers. Subsidization provides an additional incentive for farmers to insure.

The effects of the four strategies were compared with the use of a "no risk-reducing strategy" for representative corn producing locations in Illinois, Iowa, North Carolina, and South Dakota. This strategy assumes that producers sell their crops at harvest for the local cash prices. As seen below, the effectiveness of the various risk-managing strategies varies by location. These differences stem largely from differences in yield variability, yield-price correlation, and basis variability between the locations.

The results indicate that a representative corn producer in Iowa or Illinois who does not sell forward or buy crop insurance would expect, on average, that his or her revenue would be less than 70 percent of preplanting expectations about 8-11 percent of the time (Figure 3). In contrast, the probability of such a low revenue is much higher in North Carolina or South Dakota--about 20-25 percent of the time. This is because yields are more variable in North Carolina and South Dakota than in the central Corn Belt. Moreover, the negative relationship between yield and price--called the "natural hedge"--is relatively weak in North Carolina.

The natural hedge is an important concept in analyzing risk. For example, in the major producing areas of the Corn Belt, the widespread occurrence of low corn yields can cause prices to increase significantly. Conversely, low prices are often associated with bumper-crop years. This "offsetting" relationship between prices and yields tends to stabilize farm revenues over time in these areas. Yield and price variations are less likely to offset each other in their effects on revenue where the natural hedge is weak. In states such as North Carolina, low corn prices and low yields (or high prices and high yields) are more likely to occur at the same time than in the Corn Belt, making corn revenues inherently more variable. This is because these areas have less impact than the Corn Belt on national output and prices.

Forward selling part of the expected crop prior to harvest reduces risk modestly compared with the "no strategy" case, although the impact varies considerably across locations. When the optimal amount is sold forward, the probability of revenue amounting to less than 70 percent of expected levels declines to 6-8 percent in the central Corn Belt and to 15-20 percent in North Carolina and South Dakota. Forward selling reduces revenue risk substantially in North Carolina, where the natural hedge is relatively weak.

Forward selling--either through hedging, buying a put option, or forward contracting with a local elevator--results in similar risk reduction. Each method has pros and cons depending on the farmer's situation and risk preferences.

Futures hedging ensures a highly competitive price, but requires access to credit if prices rise before harvest. Buying put options gives farmers the right (but not the obligation) to sell a futures contract at a specific price. Put options provide protection against price declines, without completely eliminating opportunities to gain from price increases, but there is a premium cost. Cash forward contracting with a local buyer is the simplest for many farmers and assures a physical outlet, but offers less flexibility and may not result in the highest price.

Used alone, crop insurance tends to be more effective than forward pricing in reducing revenue variability. The effect is the greatest in South Dakota, where yields are more variable than in the other three states in the ERS study. Whether crop insurance or forward selling is more effective by itself depends on the relative variability of yields, and on the fact that crop insurance has been offered with a maximum of 75 percent coverage. Coverage higher than 75 percent would be more effective in reducing risk, particularly in the Corn Belt, but also could raise Federal costs by increasing farmers' temptations to reduce inputs once yields are guaranteed.

When a producer combines a forward sale with the purchase of crop insurance, the probability of low revenue is reduced dramatically for each of the locations, compared with the no-strategy case. The two strategies complement each other strongly, particularly where the natural hedge is strong. Probabilities of revenues below 70 percent of expectations are reduced significantly in every case, and reduced to nearly zero in Illinois and Iowa.

The greatest risk reduction among the alternatives examined is provided by 75-percent-coverage revenue insurance. (The revenue insurance plan assumed here is an intra-seasonal guarantee based on individual farm yields and futures price projections, and does not include a replacement coverage component--only a basic revenue guarantee. Thus, it is more similar to IP or RA than to CRC.) Such coverage reduces the probability of revenues less than 70 percent of expectations to zero, except for risk associated with differences between local prices and futures prices at harvest-time (i.e., basis risk).

These examples show that probabilities of revenues falling below 70 percent of signup time expectations can be reduced substantially by combining forward pricing and crop insurance. Direct revenue insurance can be even more effective in reducing probabilities of such low revenues. Moreover, the consistent use of these strategies in successive years can be expected to reduce year-to-year variability in revenues because signup time yield and price expectations are less variable than the yields and prices realized at harvest. This year-to-year stabilization effect is not quantified here.

But farmers face longer term revenue risks when prices differ from historical levels for more than a year. Dealing with these longer term risks calls for other types of strategies, such as holding reserve funds, diversification among enterprises, adopting risk-lowering technologies (such as shorter season crop varieties or supplemental irrigation), and acquiring off-farm sources of income. As indicated by the FCRS data, many producers are using a combination of such tools and strategies. However, many issues remain regarding risk management, particularly over the long run.

Issues for the Future

Can farmers use existing tools more effectively? The effectiveness of different risk management strategies can vary widely across different geographic regions. Additional research is needed to determine what types of currently available tools and strategies are most useful to producers across the various regions, as well as to investigate new types of safety nets. And certainly, risk management education is increasingly important to help producers better understand how to most effectively use available strategies. Important issues for the future include:

- How do farmers spread risk over time? The FCRS data provide a "snapshot" for each year, but do not track producers over time. Tracking longer term behavior could be helpful in developing new products and making recommendations on inter-year strategies for different geographic locations and situations.
- Can (and should) government programs be designed to protect against inter-year revenue risk? Undoubtedly, the U.S. will experience, at some point, a sequence of years when farm-level revenues are low. Ideas for inter-year risk protection include a "target" revenue insurance program that stabilizes inter-year revenues,

or an income stabilization account approach that subsidizes producer savings to be drawn upon in years when revenues are low.

- What are the possibilities for private tools and institutional arrangements? Ideas for new private tools include longer term forward contracts, while public-private arrangements could include innovations to the current crop insurance program or the revenue insurance pilots. These programs are public-private arrangements in the sense that they are delivered (and designed in some cases) by private companies, with the government subsidizing the products (once approved) and sharing in the risk of loss.

As farm sizes become larger, some farmers may be in a better position to self-insure through the use of on-farm savings, along with use of risk management strategies. However, risk protection will remain an important issue well into the next century for farm households depending primarily on farm income, especially mid-sized commercial farms.

Risk management in farming calls for a variety of tools that, as a whole, reduce year-to-year revenue variability over the long run. Insights into the questions--and issues--discussed above may help producers better understand and cope with risks, and help policymakers and the private sector create improved safety nets for producers.

Table 1

A Comparison of Crop Insurance and Crop Revenue Coverage Acreage and Liability

1996 Corn and Soybeans in Iowa and Nebraska

Crop	Net Insured Acres (Million acres)		Liability (Billion dollars)	
	MPCI ¹	CRC ²	MPCI	CRC
Corn	10.3	7.4	\$1.7	\$1.8
Soybeans	6.8	3.3	\$0.9	\$0.6
Two-state, two-crop total	17.1	10.7	\$2.6	\$2.4

¹ Multi-peril crop insurance.

² Crop Revenue Coverage.

Table 2

A Comparison of Crop Insurance and Crop Revenue Coverage Policy Sales for Winter Wheat, 1997 Crop

(Data are preliminary, and reflect number of policies)

State	MPCI ¹	CRC ²	Total ³	Percent CRC
Kansas	63,526	7,982	71,550	11.2
Michigan	3,215	626	3,841	16.3
Montana ⁴	7,699	128	7,827	1.6
Nebraska	18,239	3,133	21,372	14.7
South Dakota	12,351	222	12,573	1.8
Texas	16,940	2,294	19,234	11.9
Washington	4,917	139	5,056	2.7
Total	126,887	14,524	141,453	10.3

¹ Multi-peril crop insurance.

² Crop Revenue Coverage.

³ Total includes a small number of Income Protection and Group Risk Plan sales.

⁴ Not all Montana counties were eligible for CRC coverage.

Figure 1
**Producers' Production Strategies for Managing
 Risk Vary by Economic Size**

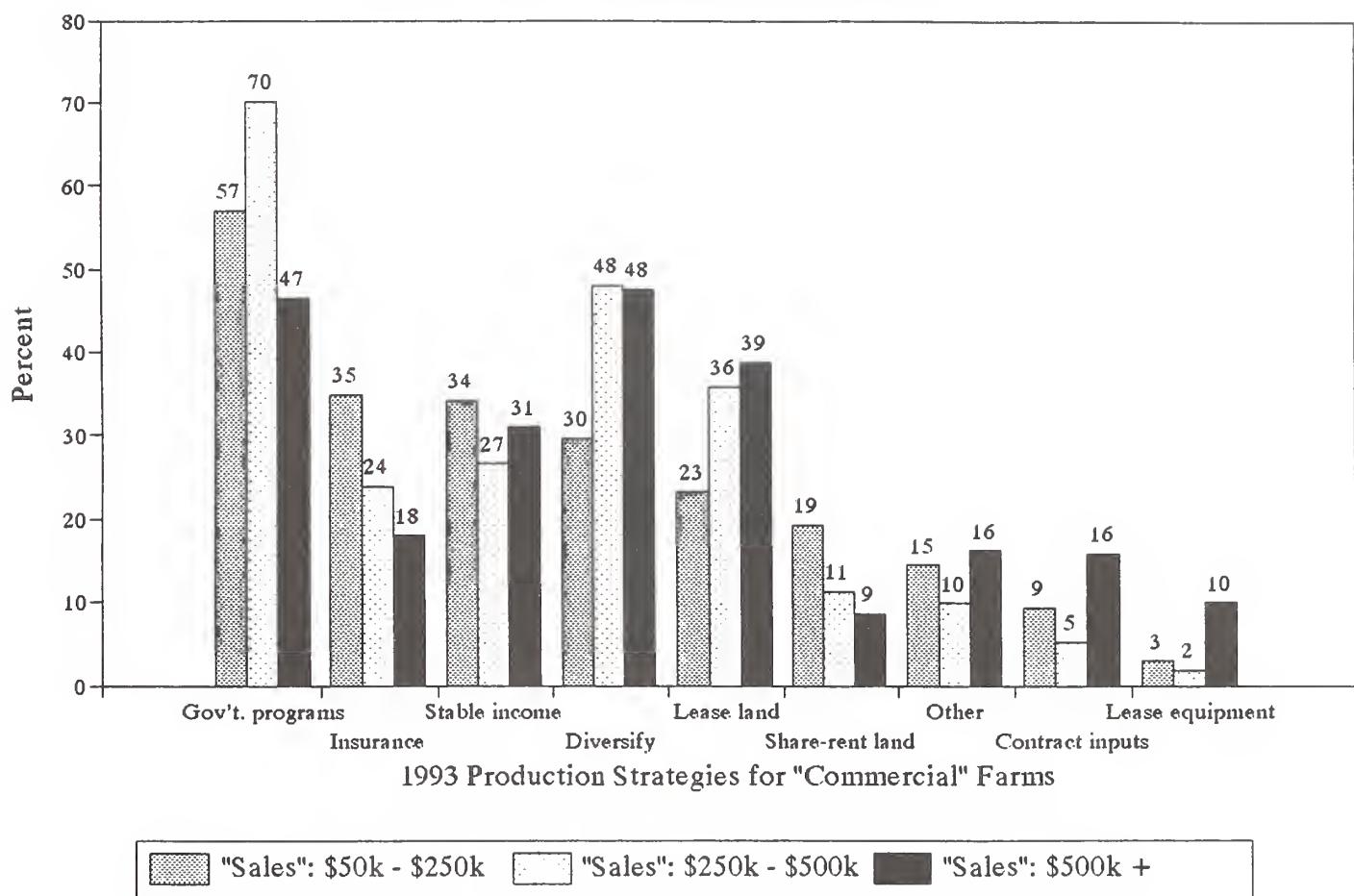


Figure 2
Producers' Marketing Strategies for Managing
Risk Vary by Economic Size

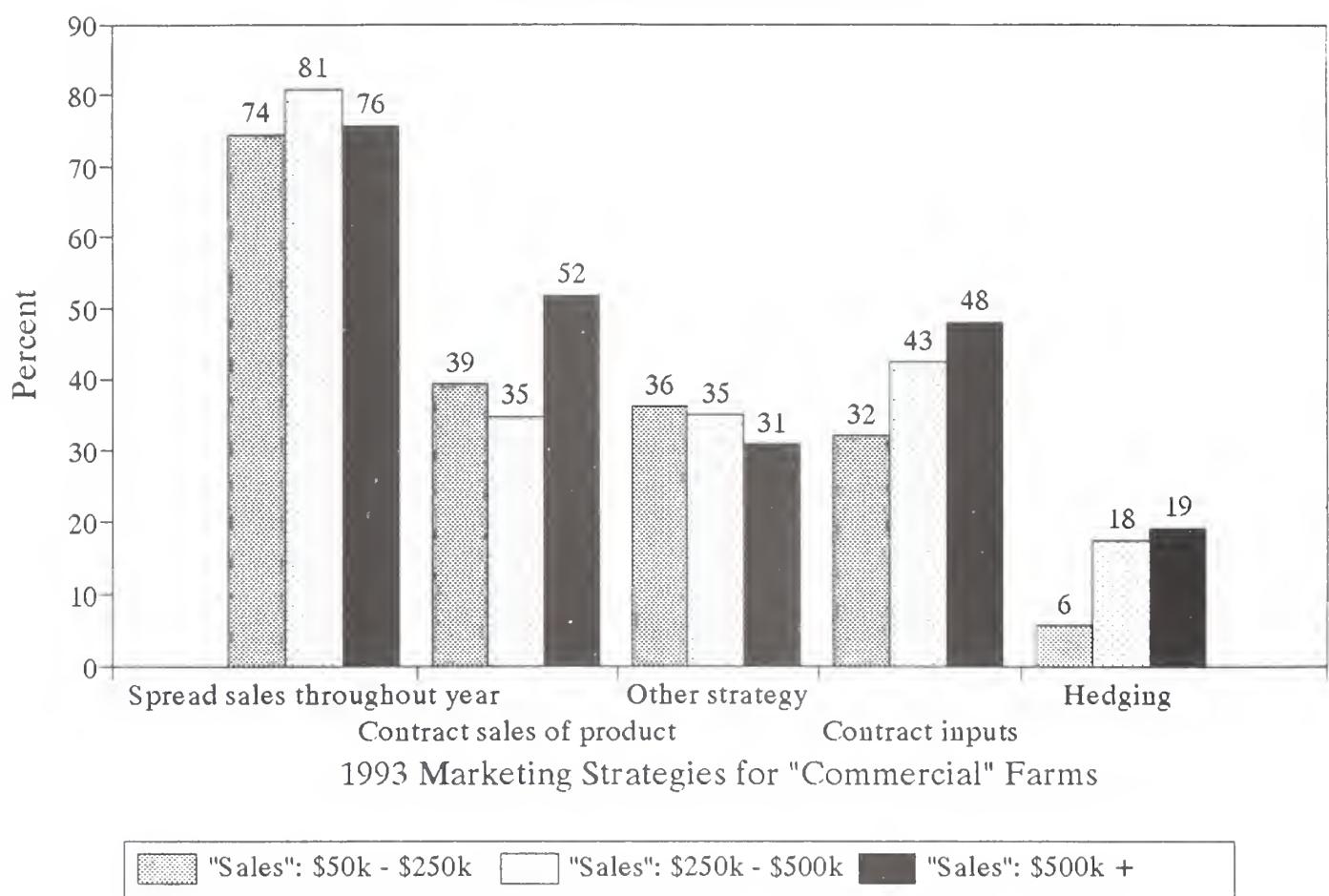
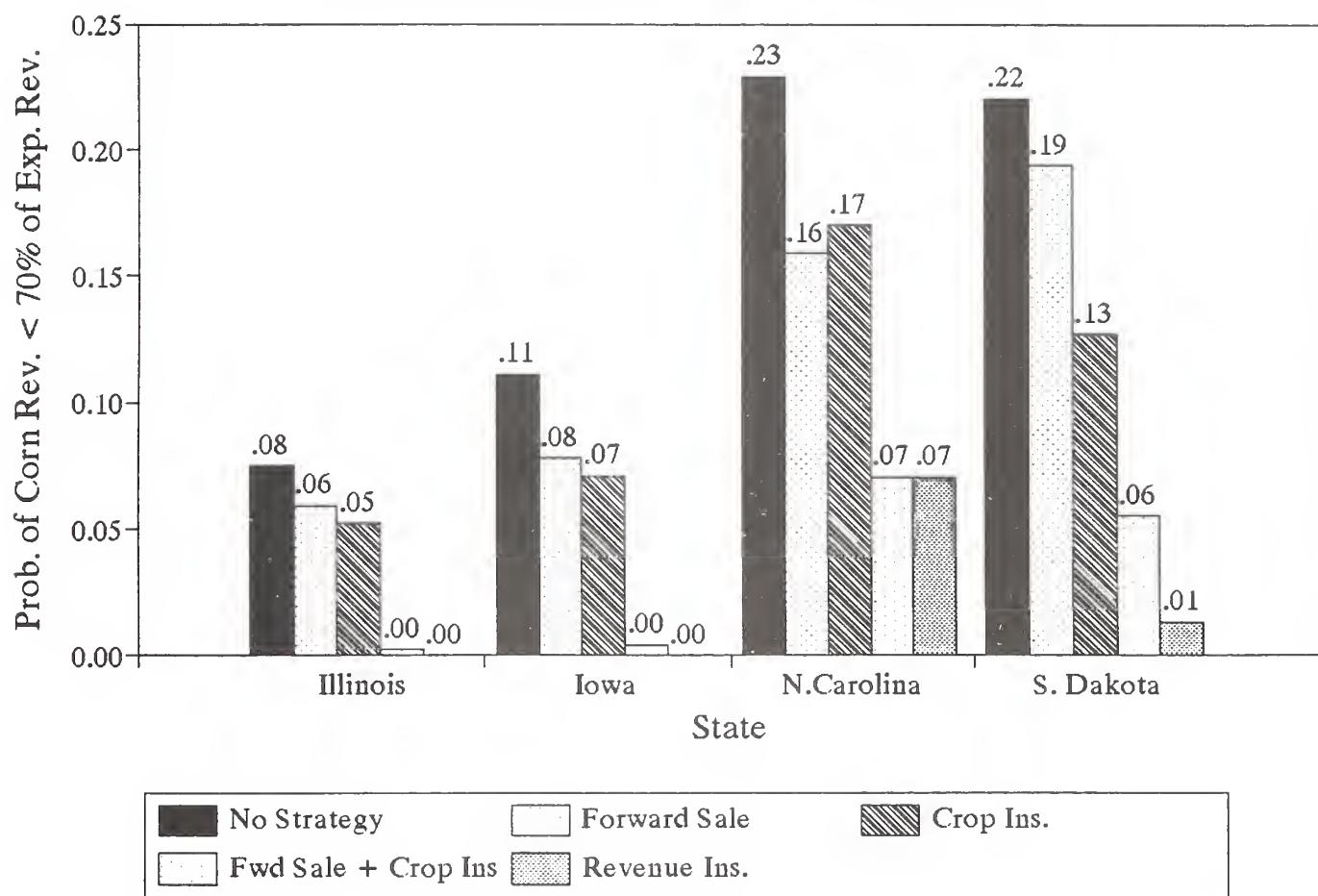


Figure 3
**Risk Management Strategies Reduce the Probability
 of Low Revenues for Corn Producers**



"NEW AGRICULTURAL RISK MANAGEMENT INSURANCE TOOLS"

Ken Ackerman
Acting Administrator, Risk Management Agency

The last three years represent a period of radical change for U.S. producers. Besides the normal factors of weather and markets, a major reason for this most recent period of change has been the Federal Government's movement toward a balanced budget. Several public policy changes have altered the Government's role in providing support for agriculture producers in managing risk. A key result of these efforts by the Administration and Congress has been to elevate Federal Crop Insurance into perhaps the principal pillar of the remaining Federal "safety net" for the American farmer.

Two key pieces of legislation have had the biggest input in making this "safety net" transition. The first was the Federal Crop Insurance Reform Act of 1994 (1994 Act) which eliminated ad hoc disaster payments and replaced them with an expanded and enhanced crop insurance program. Second was the Federal Agricultural Improvement and Reform Act of 1996 (1996 Act), which eliminated deficiency payments and lowered funding for other price support programs.

The impact of these legislative changes has been enormous on the RMA. In 1994, FCIC serviced 800,263 policies nationwide. In 1996 the number of policies rose to 2,254,599. In 1994 the total premium written was \$949,450,301. In 1996 the premium volume was \$1,815,287,210. In 1994 the total Federal crop insurance book of business represented \$13,606,300,646 in liability. In 1996 the liability was \$26,474,880,614.

U.S. farmers and ranchers in 1997 are planning and planting their second crop in this "New Risk Environment." Our farmers and ranchers must now change their management style from passive to active. Active management requires farmers and ranchers to do more analysis about which crops and how much of each to produce. The management challenge of the future is to balance risk with returns. Producers must now weigh the benefits and costs of various strategies and decide which are best for their operation and personality.

Farmers face a multitude of risks in the commodity production environment. However, Federal programs have traditionally aimed at having an impact in the three major types:

- 1) yield
- 2) price/marketing, and
- 3) financial.

The RMA is responding to new risk management needs in three principal ways: 1) by broadening existing programs, 2) by expanding current crop insurance models, and 3) by expanding services through such new initiatives as risk management education.

1) BROADENING EXISTING PROGRAMS TO UNINSURED CROPS.

Today, FCIC offers insurance on 61 different crops, representing over 75% of the value of national crop production. This excludes several hundred crops covered by the Non-insured Assistance Program (NAP). NAP is a low-level yield protection program which becomes available when a crop has sustained a loss of greater than 35% in an area. NAP is currently administered by Farm Service Agency. Over the next several years, a key goal will be to bring a large number of the NAP crops under the Federal crop insurance umbrella. Bringing these crops on line requires an analysis of their production history and underwriting profile in order to set actuarially sound rates. It is important not only that we expand the insurance program, but that we do it carefully and consistently with our standards for financial integrity.

As part of this process RMA in 1988 plans to offer the following new coverages:

- Expansion of the Group Risk Plan for wheat and forage
- Almond revenue pilot program
- Sweet potato pilot program

In 1999 RMA plans to expand further:

- Aquaculture pilot program
- Cherries pilot program
- Christmas tree pilot program
- Direct marketed vegetable pilot program
- New nursery program
- Peach revenue pilot program
- Pecan pilot program
- Turfgrass sod pilot program
- Wild rice pilot program

2) EXPANDING PORTFOLIO OF CROP INSURANCE MODELS.

The traditional Federal crop insurance coverage offered by RMA provides individualized yield coverage for producers. The 1994 Act authorized RMA to extend crop insurance coverage beyond its historic bounds. The legislation mandated a basic coverage for producers of insurable crops and permitted RMA to explore other coverages. RMA has responded to this legislative authority with the introduction of several new insurance products. So far, among other things, the result has been the introduction of Catastrophic coverage and three new revenue crop insurance products.

Catastrophic Coverage (CAT):

The Federal Crop Insurance Act of 1994 created a CAT level of crop insurance. The goal was to make crop insurance inexpensive and accessible to as many farmers as possible as a trade off to the elimination of ad hoc disaster aid. CAT coverage is provided to farmers for no premium charge. However, producers must pay a \$50 administrative fee for each crop and county insured. Producers will never pay more than the limit of \$200 per county or \$600 for a single producer for all crops and counties insured.

The amount of protection provided by CAT coverage is 50 percent of the producers historic yield insured at 60 percent of the FCIC indemnity price. For most producers, this is approximately equal to traditional ad hoc disaster payments.

CAT coverage is available for all insurable crops grown in the U.S. It may be purchased from an approved insurance provider and, in some states, from Farm Service Agency local offices.

Revenue Insurance

Both the Federal Crop Insurance Reform Act of 1994 and the 1996 Act directed FCIC to develop a pilot crop insurance program that provides coverage against reduced gross income as a result of a reduction in yield or price, or revenue insurance.

Currently, RMA is experimenting with three forms of revenue insurance that extend the coverage to include fluctuations in price. Each product employs a concept of combining yield and price risk protection into one crop insurance program to insure revenue.

Income Protection (IP).

The Income Protection (IP) pilot program was developed by FCIC and introduced in 1996. IP is designed to insure the producer against reductions in gross income from insurable reductions in yield or price. IP appeals to producers who seek a guaranteed minimum level of revenue at harvest time. Yield setting, loss adjustment, and underwriting are based on the FCIC procedure for traditional multiple peril crop insurance (MPCI).

Guarantees are calculated using the producer's historic average yield multiplied by the "projected" price, multiplied by the coverage level selected by the producer. Available coverage level choices begin at 50 percent up to 75 percent in 5 percent increments.

Indemnities are due when any combination of yield and "harvest" price is below the guarantee. IP prices are an average of the daily closing price for the commodity futures contract designated in the IP policy. For example: the IP prices for Illinois corn are calculated using the Chicago Board of Trade December corn futures contract. The "projected" price is the February daily closing price average of the Chicago Board of Trade December corn futures contact. The "harvest" price is the November average of the December CBOT contract.

(Include a price graph here)

Premium rates for IP are developed from a rating model that measures the covariance of individual yield and prices designated in the policy. For crops in areas where there is an inverse relationship of yield and price, the rates are low. The opposite is true where there is no price and yield relationship. Therefore, IP premium rates tend to be different from the traditional multiple peril crop insurance.

For the 1996 crop year, the IP pilot was available for corn, cotton, and spring wheat in a total of 30 counties.

(Attach map indicating counties for expansion)

For 1996, about 998 IP policies were purchased, covering about 218,000 net acres, with total premiums of about \$3.4 million (see the attached table). About 33 percent of IP insured acreage and 22 percent of IP premiums in 1996 were corn; about 9 percent of acreage and 38 percent of premiums were for cotton, and about 58 percent of acreage and 40 percent of premiums were for spring wheat.

For the 1997 crop year, the IP pilot program was expanded to be available for corn, cotton, grain sorghum, soybeans, spring wheat, and winter wheat in a total of 129 counties.

(Attach map indicating counties for expansion)

The pilot program will operate through the 2000 crop year.

Crop Revenue Coverage (CRC):

CRC is a revenue product developed by Redland Insurance Company and reinsured by FCIC. It was first offered in 1996 for corn and soybeans in Iowa and Nebraska. For 1997, CRC has been expanded to include cotton, grain sorghum, and wheat and has been made available in several more States and Counties. In addition to providing a revenue floor when prices decline, CRC also allows for recomputation of the revenue guarantee at harvest time to adjust for increasing price changes in the futures market. The allowance for the change in projected price from the beginning of the insurance period to the price at the end, is the primary difference in CRC and other current revenue insurance plans. The CRC also provides for unit coverage similar to the underlying MPCI policy.

(Include a map of 1997 availability).

CRC may pay an indemnity when any combination of yield and harvest commodity price is below the guarantee. The additional coverage component applies when two events occur: 1) the actual yield is below the guaranteed bushels and the harvest price is above the "projected" price. The indemnity is the bushel shortfall multiplied by the harvest price. This type of coverage is also referred to as replacement coverage because the lost bushels are indemnified or replaced at the harvest price.

The premium rates for CRC are based on the MPCI policy rate plus a low revenue factor plus a high price factor. The addition of these factors is the reason that CRC coverage is more expensive than MPCI products.

CRC appeals to producers who desire a guaranteed minimum level of revenue protection and coverage for aggressive marketing commitments. The producer managing price risk could market up to 75 percent of their guaranteed production before the crop is harvested. For example, in 1996 a CRC insured could contract for the July seasonal high with the assurance that at harvest time they would have the bushels or the money to liquidate the contract.

For Iowa and Nebraska corn and soybeans in the 1996 crop year, farmers purchased about 80,000 CRC policies covering about 10,738,000 net acres with total premiums of about \$134 million. For the 1997 crop year, the data is still incomplete.

Revenue Assurance (RA)

RA is new concept developed by Iowa Farm Bureau and reinsured by FCIC. Iowa corn and soybean producers will be able to select this coverage beginning with the 1997 crop year.

RA shares many of the same features as IP but has some unique differences. For instance, under RA, commodity prices are adjusted to a county level price and the producer's premium will vary by the method they choose to identify insurance units.

Pricing RA by the unit division allows producers to better manage risk. The producer who is interested only in farm totals and the lowest possible premium cost can choose the whole farm corn and soybean unit. At the other extreme, the producer who is concerned about losses on the smallest possible acreage can elect that coverage and pay additional premium.

Revenue product summary:

All crop insurance products have important risk management features. In the prior decade, we promoted crop insurance as loan collateral and family security. Producers selecting the new revenue based products in the "new risk environment" can also give themselves a firm basis to aggressively market their crops during the growing season up to their amount of protection. Many have learned the value of crop insurance products to backstop their marketing plans.

The Presidents 1998 budget proposes legislation authorizing nationwide expansion of revenue insurance. So far, the revenue products have been limited to only certain States and crops. Still, this new approach has been widely accepted by farmers who have had the opportunity to obtain it.

Other new models:

A: Options Pilot Program (OPP)

The OPP is currently being reviewed by RMA for future development. The concept is to use commodities futures and options as tools to protect producers from fluctuations in price, yield, and income, but at no additional cost to the Government "to the maximum extent practicable. Under FSA's stewardship from 1993 through 1995, the program provided participants with in-the-money options and incentive payments in return for their participation. Participants would voluntarily forego their FSA program payments in return. The results of these first three years' experience were inconclusive due to the impact of early exercise of the in-the-money instruments. The program was not activated for either the 1996 or 1997 crop years.

RMA has the benefit of the experience of the first attempt at an OPP as it reviews the program for possible re-implementation. RMA's version of the OPP will undoubtedly take a new approach that will draw on its own analysis and the Office of Inspector General's Audit Report on the first three years of the OPP. Further, RMA will accept proposals from outside sources on OPPs for specific commodities to add to pool of suggested alterations. One such proposal has already been received from the Coffee, Sugar, Cocoa Exchange (CSCE) for a fluid milk OPP.

The milk OPP proposal calls for implementation in six counties in each of six states and offers some very interesting innovations to improve upon the weaknesses in the former OPP. The use of out-of-money instruments combined with a limitation on their exercise prior the contracts' becoming either "at" or "in"-the-money addresses the problem of early exercise that plagued the preceding OPP. In a sense, from an insurance perspective, the use of out-of-the-money instruments acts as a kind of deductible to the contract holder, and less like a cash transfer than the use of in-the-money instruments.

The jury is still out on the viability of the OPP as a government program in general. However, RMA is encouraged that the opening-up of the process to outside proposals will provide a wealth of ideas that will eventually make the OPP, in its new form, more useful as an educational tool to the producer as well as more responsive to the fiscal concerns of the taxpayer.

B: Canadian Program:

Another intra-year income safety net is currently operating in Canada called the Net Income Stabilization Account (NISA). That concept could be adapted to U.S. agriculture. The basic concept is that in years of good income a producer could deposit part of their income in a tax deferred account. The deposits are then matched by the Government. In a year when income was low, or other triggering devices are met, they could draw a specified amount from their account. RMA is studying their program to determine its feasibility in the U.S.

3) EXPANDING SERVICES: Risk Management Education

RMA will play a key role in helping farmers become more knowledgeable about the decisions they face with more active risk management. During the transition, RMA will lead a Risk Management Education Initiative that provides farmers with objective and unbiased information to take advantage of opportunities and avoid pitfalls . This initiative represents a joint effort with CREES and CFTC, and will rely strongly on the involvement of private sector entities interested in educating farmers about risk management.

U.S. producers need new and improved risk management tools and the knowledge to use these tools correctly. Much work is being invested in learning how tools of the crop insurance industry, cash grain trade, and commodity futures industry can be used together in a risk management strategy. Risk management education will aid in this adaptation.

RMA is looking forward to the challenges which lay ahead. Producers must be provided the tools and knowledge to operate in this new risk environment. To this end, the Agency will broaden our existing program base, expand the portfolio of insurance models and coordinate needed educational opportunities for the US farmer. We are committed to working with other Federal Agencies and private sector enterprises to accomplish these goals.

RISK MANAGEMENT FROM A PRODUCER'S POINT OF VIEW

by

John C. Kintzle
Iowa Corn and Soybean Producer

Over the years, much has been written about risk management for U.S. Agriculture. But at no time in the history of modern production agriculture has this issue been more thoroughly discussed. Hardly a day goes by where the American producer cannot read a farm publication or attend a marketing meeting without someone expounding the importance of risk management.

We, the producers, hear it talked about from the halls of Congress to the local coffee shops. Having farmed for 32 years, I have always known there is a certain amount of risk in farming. But, today I have everyone reminding me!

Risk Management in Transition

As I mentioned in my opening statement, risk has always been associated with American agriculture. Not only are producers faced with weather risk, but we are also faced with marketing risk. Just in the last ten years alone, I have farmed through the worst drought since the 30's (1988) and the worst flooding in Iowa history (1993). During that time, the price of corn fluctuated from \$2.20 a bushel to \$5.50 a bushel. So why all the attention to risk management today?

Probably the number one reason for all this attention is the "Fair Agriculture Improvement and Reform Act" (FAIR), better known as "The Freedom to Farm Act," which became law in 1996. Other factors changing the risk environment of producers are changing global trade patterns, grain reserve policies and changing climate patterns.

Under the new Freedom to Farm Act, crop subsidies are no longer tied to price fluctuations in the market. Instead, producers receive fixed payments over a seven-year period, on a declining basis, which will end in 2002. Under the new law, the risk becomes greater because the producer must rely totally on the marketplace, especially as we near the year 2002. It can also be argued that the Freedom to Farm Act has increased the risk of the producer because much of the first two year's payments are being capitalized into higher land rents and higher land values. This means that the fixed farm payments are being used to increase production cost instead of retiring debt. With the global competition we face today, this certainly increases risk to the American producer.

Global trading patterns have always changed, but will probably do so at a faster pace as we enter the next century. In the 70's and early 80's, everyone thought that the Soviet Union was the answer to our world trade woes. Look where they are today. In the 90's, China is being looked upon as a major buyer of U.S. agricultural products. That market is indeed very large, but could be disrupted by human rights issues and other political problems. Along with changing global trade patterns, several major grain-producing countries are de-emphasizing grain reserves. These declining reserves, combined with the major reductions in U.S. grain reserves, means increased grain price volatility.

One of the major risks in production agriculture is the weather. There is much talk that the Earth's climate pattern is changing and we are experiencing a warming trend. Many will argue that that is not true. One thing we know for sure, corn yields have been quite variable in Iowa since about 1975 compared to the previous 25 years (1950 - 1975). The yields, on my farm in Eastern Iowa, have varied much more the past 10 years when compared to the first 20 years that I farmed.

Even though technology will continue to push the yield curve upward, weather will continue to be one of the major risks producers will face in production agriculture. Learning to manage price and yield risk will be extremely important as we transition production agriculture under the new farm law and increased global competition.

Managing Price Risk

The number of ways to manage price risk is as numerous as the streets that converge at the Capitol in Washington DC. They will all get you to the Capitol, but no one knows for sure which street is the best way. If you don't believe me, just ride with a DC cab driver.

The tools available for managing price risk today include storage, forward cash contracts, selling futures, using options, basis contracts, and numerous other strategies. Probably using any of the tools I mentioned would be better than doing nothing and being at the mercy of the market at harvest time.

Storage on the farm is one of the most basic risk management tools and is used by a majority of producers. It allows the producer to sell at different increments over the year, thus increasing the odds of getting an average price. The downside, of course, is holding the grain too long and passing up good pricing opportunities.

Forward cash contracts are another tool used by a large number of producers. Farmers can forward price with their local elevator anytime during the growing season for delivery at a later date. A producer might lock in a good price from a summertime weather scare and then deliver the product at harvest time. The biggest risk a producer would have with a forward contract would be a crop failure and not having the product to deliver. I will be discussing a new tool to manage that risk later.

Selling futures, or hedging, gives a producer greater flexibility than cash instruments, but certainly requires the most discipline and understanding of the market. To trade futures, a producer must start an account with a futures broker and deposit margin money to guarantee that position. If that position shows a loss, a deposit of funds must be made on a dollar-to-dollar basis. The producer will also incur commission fees on their position. Financing a futures account can be a major obstacle if a producer plans to stay with a hedge all the way until harvest and prices rise. Because a producer must margin his account if prices rise, it is very important to have a banker that also understands the market.

Since 1985, farmers have been able to trade options on the commodity futures. Using the option market is similar to buying an insurance policy. An option to buy futures is a call option which is used by most producers. If a farmer paid 15 cents a bushel to buy a December \$3 corn call and the market went to \$3.50 a bushel, the producer would receive a majority of that price increase. If the market went below \$3 a bushel, the producer would only lose the 15 cent premium, no matter how low the market went. When producers use options, they limit their risk to the price of the call, which is why options have become quite popular among producers.

As I had mentioned earlier, there are several strategies for a producer to price their commodities, some more risky than others. Like most things in life, the bigger the reward, the larger the risk.

Managing Yield Risk

Managing yield risk has always been a challenge for the American producer because yield is extremely important. Producers can have the best of prices, but if they have little or nothing to sell, the results can be disastrous.

Producers can control their yield risk, somewhat, by making sound management decisions. A producer could install an irrigation system on his or her farm to lower the risk of a crop failure in a dry year. Installing a drainage system on a farm would lower the risk of a crop failure in a year when there is excessive rainfall. Both of these actions could lower a farmer's yield risk, but would require a large capital expense, especially irrigation.

Not all yield risk management tools need to be expensive. In fact, rotating crops or using a no-till system could lower a farmer's cost of production. Since July is the most stressful month for corn in Iowa, and August is the most stressful for soybeans, producers in Iowa could lower their overall yield risk significantly by raising a 50/50 mix of corn and soybeans. Choosing the right seed, chemicals and fertilizer for their farm are other choices producers have which limit their yield risk.

Yield risk is always on the minds of producers from the day they plant their crop to the day they harvest it. Producers can make all the right management decisions during the growing season, but in the end, Mother Nature always calls the final shot.

Because weather is such an unknown, producers have always looked for ways to manage that risk. They have used hail insurance for years to manage yield risk across the U.S. It is sold by a number of companies and is quite popular yet today in the high-hail areas of the country.

Federal Crop Insurance, better known today as Multi Peril Crop Insurance (MPCI), has been available to the producer for several decades. Only within recent years, has it had wide-spread use. However, today MPCI is being purchased by more producers than ever before. There are probably many reasons for this change; increased cost of production; crop failures in large areas; pressure from bankers and many others. But the main reason for this change is the action taken by the U.S. Congress.

In the past, whenever there was a major crop disaster in a large area of the country, Congress would give ad hoc disaster relief. There wasn't much incentive for producers to buy MPCI coverage when they knew, under political pressure, Congress would come to their rescue. Congress finally sent the message that MPCI would be the basic tool for disaster relief in the U.S. Since that time much has been done to improve MPCI. By working together, the government and private insurance companies have brought new and innovative products to the American producer.

Managing Yield and Price Risk With New Products

As I mentioned earlier, many producers use forward contracting to lock in a profitable price. One of the fears in doing so is that a producer would not have the bushels to deliver at harvest time and the price is higher. If a producer sold 50,000 bushels of corn at \$2.50 and only produced 40,000 bushel, he or she would be 10,000 bushels short on the contract. If the price, at harvest, was \$3.00 a bushel, the producer would have to buy 10,000 bushels of corn at \$3.00 a bushel on the open market and then deliver it to whomever the contract was with for \$2.50 a bushel. A new plan, called Crop Revenue Coverage (CRC), addresses this problem.

Under CRC, the producer selects a revenue per-acre coverage. The insurable price level is based on the new crop futures prices in February, rather than the Farm Service Agency's projected price. The insurable price times the yield election equals the gross income guarantee. If prices reach a higher level by harvest time, the income guarantee is raised accordingly, but it will not be lowered. If the producer's actual gross revenue, based on the actual yield and the harvest price, is below the insured level, an indemnity payment equal to the difference is received.

CRC was available in Iowa and Nebraska, for both corn and soybeans, for the first time in 1996. It will be expanded to several other states in 1997.

Also, for 1997, a new product will be available in Iowa called Revenue Assurance. It will provide 65 or 75 percent of a farm's expected revenue for corn, soybeans, or both. A farmer's expected revenue will be based on the government's posted county price multiplied by the farmer's proven historical yield.

These new products will certainly help producers to manage crop production risk in the years ahead. Just as new technology will continue to change the way farmers produce commodities, new and innovative insurance products will be necessary to help American farmers to better manage their risk into the future.

Risk Management Into The Next Century

Even though American agriculture producers will continue to have some of the world's best technology for crop production at their fingertips, price and yield risk will be a part of their life. It will be up to the American producer to manage that risk into the next millennium to the best of his or her ability. As we approach the year 2002, I don't believe there will be the dollars in the U.S. Treasury or the will of the American people, to return farm programs to the days prior to "Freedom To Farm."

As American agriculture goes down this new road, I hope we are not haunted by that old saying, "Be careful what you wish for, you might get it." But, as my father always said about farming, "If it was easy, everybody would be doing it."

Market Stability and World Food Security: What Do Importers Face?

David Blandford¹

International trade plays a vital role in the world's food supply. Although imports of grain account for less than 20 percent of global consumption, this is actually a large figure. Grain is a bulky commodity and a large amount is fed to livestock in the countries in which it is harvested. Developing countries are the major importers of foodgrains, such as wheat and rice. Developed countries have traditionally dominated imports of feedgrains, but rapidly industrializing countries, particularly in Asia, are becoming increasingly important purchasers.

Importers have very similar interests in terms of international markets. They want assured access to supplies of grain of an acceptable quality at "reasonable" prices. Being economically rational, they are happy to obtain grain at the lowest possible cost. For the most part, they do not care whether this results from subsidies by exporters. However, importers tend to be more concerned by the possibility that prices will be "unreasonably" high, and especially that they may face rapid increases in prices.

Despite expressions of concern about food security, most wealthy importing countries do not have to worry about international grain prices. Even if their reliance on imports is great, wealthy countries can afford to pay for a commodity that accounts for a small part of their total import bill and a modest share of consumer expenditures. Poor countries, on the other hand, do not have such a luxury. For them rapid increase in the price of imported grain may mean hardship for their people and the threat of social unrest.

Has the market picture changed?

Political concern about price instability and food security seems to vary cyclically. In the early 1970s, a rapid increase in grain prices triggered by poor harvests, large purchases by the Soviet Union, and a run-down in stocks, particularly US stocks, precipitated the 1974 World Food Conference in Rome. There were fears that the world would not be able to produce enough to meet the basic aim of the conference that "every man, woman and child has the inalienable right to be free

¹ Economist in the Directorate for Food, Agriculture and Fisheries of the Organization for Economic Cooperation and Development (OECD) in Paris, France. The opinions expressed are those of the author and should not be attributed to the OECD or to its member governments. Several colleagues (Linda Fulponi, Josef Schmidhuber, and Garry Smith) provided useful comments on an earlier draft, but they are not responsible for any remaining errors.

from hunger and malnutrition". And yet, for most of the years following the Conference, the world was awash with grain. Many governments struggled to deal with stocks that built up under price support programs. They used incentives to try to convince farmers to produce less, and subsidized exports. International grain prices, after adjusting for inflation, continued to decline at or above the 1 percent average annual rate that has applied since the early 1960s (Blandford).

The picture is now very different. There have been major changes in policy in key exporting countries, particularly the European Union and the United States, a resumption of rapid growth in global demand for grain, particularly in newly industrializing countries, and the signing of the Uruguay Round Agreement (URA) limiting the use of export subsidies. Following two years of reduced world production and falling stocks, particularly in the major exporters, international wheat and corn prices rose in 1995/96 to their highest level in 20 years. This change in the market meant that renewed attention was focused on food security issues in the lead up to the FAO Food Summit in November 1996.

What will happen to stocks?

In terms of factors affecting the potential variability of international prices, the greatest change over the past few years has been the virtual elimination of public stocks of grain in OECD countries². By the end of the 1995/96 season, stocks of wheat in OECD countries had fallen to roughly 19 percent of production, compared to an average of 29 percent during the preceding five years. In an era of budget restraint, governments are increasingly unwilling to fund stockholding and expect this to be undertaken by the private sector. It is difficult to determine the extent to which the reduction in the role of the public sector will be replaced by private stockholding in OECD countries, but some increase in private stocks seems likely. At the same time, stocks in the non-OECD area have largely been maintained and consequently their share of the world total has increased. The share of world wheat stocks held in the non-OECD countries is likely to be around 65 percent by the turn of the century, compared to roughly 55 percent during the early 1990s (OECD, 1996).

Public stocks of grain, particularly those in major exporters such as the United States, have provided an important buffer against fluctuations in production created by the weather. While the acquisition and release of public stocks in the United States can hardly be said to have been driven by the desire to reduce fluctuations in international prices, to a large extent the amount of stocks has varied inversely with international prices on a year-to-year basis. If we look at the

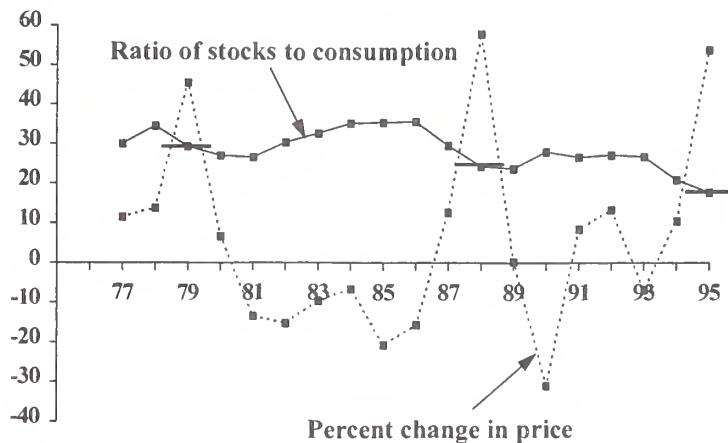
² The 29 members of the OECD are Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea (Republic of), Luxembourg, Mexico, Norway, Poland, the Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

period 1975-95, for example, the correlation between season-to-season changes in total US wheat stocks and changes in an indicator world wheat price (defined by the Argentine export price) is 0.66. From a statistical perspective, this indicates a highly significant relationship between the two. By way of contrast, for the same period, the correlation between wheat stocks and prices in the European Union was 0.35. Given that EU policy has been aimed specifically at ensuring stability in domestic wheat prices (and, in particular, maintaining a high price level relative to world markets) it is not surprising to find that this correlation does not indicate a statistically significant relationship.

The extent to which stocks vary inversely with world prices is important since it reflects the degree to which variations in international prices are transmitted to the domestic market. In many countries, various types of trade barriers, ranging from levies or quotas to state control of imports, have been used to ensure that domestic prices are kept relatively stable (and often above world prices). Changes introduced as a result of the Uruguay Round agreement have altered this picture to only a limited extent. The existence of insulating policies means that international price variations are not fully transmitted to the domestic market. Production, consumption and stocks do not react to changes in world prices, and consequently the amount of adjustment that has to occur in other more open countries to unanticipated fluctuations in production is increased. For countries that are large grain consumers, particularly of livestock feed, this is very important. Adjustment in the feeding of grain to livestock is one of the principal "shock absorbers" that exists in global grain consumption. Thus the use of coarse grain for animal feed fell sharply in 1995/96 in OECD countries (about 10 percent) as the result of higher grain prices. Such adjustment, plus increased production, caused world prices for wheat and coarse grains to fall by 25-30 percent from the peaks reached in 1995/96.

The stocks-to-use ratio provides an important indicator of when the world is at risk of experiencing rapid increases in grain prices. If stocks are low relative to consumption, there is clearly a greater risk of a run-up in prices if production is below average. But it is important to note that the ratio at which price spikes are likely to occur is not fixed, as is sometimes assumed. In fact this ratio has been declining over time. The three major episodes of sharp upward price movements in wheat since 1975 occurred with substantially different stocks-to-use ratios (figure 1). In 1979 a run-up in world wheat prices took place with a stocks-to-use ratio of 30 percent, whereas a broadly similar price run-up in 1995/96 occurred when the ratio was less than 20 percent.

Figure 1. PRICES ARE BECOMING LESS SENSITIVE TO STOCK LEVELS
World wheat



Source: OECD Agricultural Outlook Database.

An explanation for this decline in the sensitivity of prices to the level of stocks is not hard to find. The last twenty years have witnessed an enormous increase in efficiency in the functioning of international grain markets. Information on availability and demand has become more accurate, and easier and faster to obtain. Improvements in infrastructure in many countries mean that available supplies can be moved to market positions more rapidly. The revolution in communications technologies and computing have made a significant contribution to efficiency. There are fewer stocks tied up under government programs. In some cases domestic markets have become more open, allowing more of the adjustment to a short global crop to be reflected in consumption. Thus the world can expect to have less variable grain prices with lower levels of stocks. This is good news, since storage is expensive and few in the private sector are prepared to absorb the costs of holding significant grain stocks from year to year.

While it is likely that the volume of stocks held in private hands will increase as governments withdraw from the business of supporting prices, it is unlikely that the private sector will hold as much, on average, as the public sector has in the past. When governments are in the habit of intervening in the market to support prices, there is a tendency for private stocks to fall to low levels. There is little money to be made if prices are stable. Costs for grain users can be reduced by relying on publicly financed storage to ensure regularity of supply. Thus public stocks tend to crowd out the private sector. When governments move out of the picture, private stocks tend to increase, essentially to manage the flow of transactions within the season. The management of intra-seasonal storage can therefore be expected to become more significant for the private sector in coun-

tries where governments are withdrawing from the grain market. But the private sector is unlikely to find it profitable to hold large carryovers of stocks from one year to the next.

What more can be done?

Considerable potential exists in international grain markets for adjusting to unanticipated shocks. Producers and consumers respond rapidly to price signals, when these are transmitted to them. The rapid adjustments in supply and demand in response to the high prices of last season are evidence of this. However, there are two areas in which more can be done to promote greater stability. The first of these is through further reform of agricultural and trade policies. The second is the development of private sector mechanisms to deal with price variability and risk.

As indicated above, there have been some positive steps in reforming domestic policies that contribute to distortions in international grain prices. The Uruguay Round agreement helped to consolidate such domestic reforms by putting restrictions on the use of export subsidies, increasing market access, and reducing the level of support. However, the actual progress made through the URA in opening up domestic grain markets to trade was modest. The replacement of non-tariff barriers by bound tariffs was a significant step, but many of the tariffs fixed under the Agreement are high, if not prohibitive (OECD, 1995). The market access provisions permit higher imports, but do not necessarily create a strong linkage between domestic and international prices, particularly if the import commitment is met through purchases by state trading agencies, whose activities are generally not transparent. Some countries use export taxes when world prices are high in order to maintain domestic price stability. There still exists a substantial amount of insulation of domestic markets from the international grain market.

Further progress in reducing trade barriers and the consequent globalization of markets would help to increase the collective capacity to adjust to shocks. Policy reforms that do not lead to the closer integration of domestic and international markets can actually increase the potential variability of international prices. What is required is reductions in tariffs to levels that result in the effective transmission of changes in international prices to domestic markets. The resulting market integration would do much to contribute to greater price stability at a global level. Until such integration occurs, it is inevitable that policies and policy interventions will continue to have a potentially destabilizing effect on international prices.

The second area in which changes could be achieved is through the growth of private sector mechanisms for managing price variability and risk. In many countries in which domestic grain prices have largely been controlled by the govern-

ment, agents (producers, intermediaries and consumers) have limited experience with strategies for dealing with price variability. When the government guarantees prices, farmers or merchants have little need to develop a marketing plan for their grain, to decide when to sell or to store, whether to contract forward, or whether to use futures or options as part of a risk management strategy. When the government steps out of the grain marketing picture, there is a need for agents to develop such skills and to be able to take advantage of the private mechanisms that exist for risk management.

Clearly there is great commercial potential in this area, and those who provide risk management services, such as commodity futures exchanges, are very well aware of the possibilities. It is interesting to note the general increase in interest around the world in the potential for expanded use of futures and options for risk management in agriculture. There are many technical issues to be faced, particularly where there is a general lack of experience with these mechanisms. There may be regulatory issues, particularly if the range and availability of contracts is to be expanded. Recently there has been an enormous increase in electronic commerce for agricultural products, particularly through the Internet. While much of this has focused on cash transactions, the use of the global information highway for trading in futures and options may not be far away. The opportunities for the globalization of risk management through new technologies are intriguing, but raise numerous issues, not least for national governments and market institutions.

How will importers cope?

As with so many aspects of modern life, conditions are changing rapidly in international grain markets. While we have not yet reached a "brave new world" of minimal government intervention, such a world may be in sight. This will be one in which market prices do the job of signaling scarcity or abundance and guiding the allocation of resources. Price variability is a natural part of market adjustment and a normal feature of efficiently functioning agricultural markets. In the main, government intervention has not been particularly successful in reducing such variability, or if it has, this has come at a considerable cost to the country concerned or to others affected by the results of its actions.

Poor countries that import significant quantities of grain on commercial terms may experience economic and social problems if prices rise too sharply. Their special needs were recognized in the Uruguay Round agreement and reaffirmed at the recent Singapore summit meeting of the World Trade Organization. In the short term, the world community can best cope with the implications for poor countries of allowing prices to work by using targeted assistance. In the longer term, the solution lies in addressing the root cause of food insecurity - poverty (Blandford and Viatte).

The world as a whole can best cope with unanticipated variability in prices due to the weather by working to ensure the full integration of domestic and international grain markets. This will require further reform of agricultural and trade policies to ensure true globalization and greater sharing of the burden of adjustment. Importers can best cope with the effects of such integration by facilitating the development of private mechanisms for risk management.

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A PRODUCER'S PERSPECTIVE ON CHANGING FARM PROGRAMS

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Farm operations are going through a consolidation and are quickly evolving into large size businesses. The future will see a more sophisticated, business approach to management of farms. The question is, are we ready to accept farming as a business and not as a lifestyle? If so, let's quit changing the rules and let the marketplace work! Some significant changes are occurring in the farming world. The current farm program rules will provide higher, more stable yields. Crop acreage decisions will be based upon the best crop management and business decisions instead of on just price or program requirements. The market will have to provide substantial incentives for farmers to switch acres between corn and soybeans. Livestock operations are getting bigger, causing a steadily increasing feed demand which is more sensitive to quality than price. New technology like precision farming and Bt corn will increase yields and provide more yield stability. Farm size will continue to increase and farm numbers will decrease due to economies of scale.

Will government and farmers allow these changes to naturally occur without unwarranted intervention? How fast will the market learn to react to the new changes?

CROP ACREAGE DECISIONS:

The 1996 Farm Bill will provide a great benefit and reward to those farm operations with good management. For those operations lacking management and planning skills, it is going to provide new and difficult challenges. Under the old farm program, the decision on what crops were planted was simple. To maximize government payments, you planted all of your allowable base acres of each program crop. In Iowa, this meant you planted the maximum corn acres. In many cases, farms had near 100% corn base, so a lot of corn was planted. Once the program and set-aside requirements were established for the year, the crop plan was set for that cropping year. Under the old program, the price of the program crop was essentially established, therefore, a marketing plan was not really needed. Marketing your crop will now become more challenging and more important.

The rules have changed and more careful examination needs to be done of what crops we grow. Unfortunately for farmers in Iowa, we basically can plant either corn or soybeans. The flexibility of the current program is moving us to a 50/50 rotation of corn and soybeans. The move closer to a 50/50 rotation is already taking place in the Midwest. That's evident as we look at the increase in soybean acres in these states over the last few years, while corn acreage has been fairly steady.

One factor driving farms to a 50/50 rotation is that farms are increasing in size. With larger farms, an even crop split allows operations to be more efficient by spreading out the work load. The key planting time for corn is from about April 20 to May 10, while soybeans can be planted up until the end of May and still maintain good yield potential. Also, corn following soybeans can be produced at a lower per unit cost than corn-on-corn. The savings come from the need for less nitrogen, less insecticide, and higher yields.

Corn-on corn will produce on average 10 to 15% lower yields with the potential for greater yield reductions under stress conditions. Soybeans are no longer being considered a secondary crop like they once were under the old program. What we have found is that soybeans are a good risk management crop. Soybeans will generally handle more adverse conditions with less yield loss than corn under the same conditions.

YIELD STABILITY:

A balanced crop rotation or any rotation that gets away from growing one crop continuously will provide the opportunity for higher yields that are more consistent from year to year. A mono crop environment introduces more insect and disease problems that reduce yields. Rotating crops breaks up the insect and disease cycles. Crops like corn and cotton are going to benefit tremendously by bringing another crop into the rotation. The environment will also be a big beneficiary of a crop rotation. The rotation provides an alternative strategy to using plant protection chemicals to battle insects, disease, and weeds. In corn, nitrogen requirements are also reduced when rotated with another crop. Weather stress has less of an impact upon a rotated crop than a mono-culture crop.

PRICES NEEDED TO ATTRACT ACRES:

1997 Estimated Crop Costs for IA - ISU, Duffy and Vontlage (*AK)

	Corn after Soybeans <u>150 bu/A</u>	Corn after Corn <u>135 bu/A</u>	Soybeans after Corn <u>50 bu/A</u>	Soybeans after Soybeans* <u>45 bu/A</u>
Preharvest Machinery	\$18.86	\$22.79	\$19.19	\$14.58
Seed, Chemicals, Fertilizer, etc.	\$136.69	\$154.67	\$89.65	\$89.65
Harvest Machinery	\$50.37	\$47.01	\$20.94	\$20.59
Labor	\$21.00	\$23.80	\$18.20	\$16.10
Land	<u>\$145.00</u>	<u>\$145.00</u>	<u>\$145.00</u>	<u>\$145.00</u>
Total Cost per Acre	\$371.92	\$393.27	\$292.98	\$285.92
Total Cost per Bushel	\$2.48	\$2.91	\$5.86	\$6.35
Cost + 10% Profit	\$2.73	\$3.20	\$6.45	\$6.99
DEC/NOV Futures 2/13/97		\$2.68		\$6.99
Local Fall Prices 2/13/97		\$2.37		\$6.47

The decision to plant more acres goes beyond the price of one crop being better than the other. Also, a higher profit potential for one crop doesn't necessarily justify an increase in acres for that crop. The crop rotation/acreage decision has implications for at least two years. Therefore, as I make a decision, I am looking beyond the price or profit potential for the crops today.

The following is an example of a 2000 acre farm and the impact on profitability under three different crop acreage scenarios, assuming an expected price of \$2.50 for corn and \$6.50 for soybeans.

50/50 Corn and Soybean Rotation

Crop	Acres	*	Bu/Acre	*	Price	=	Gross Revenue
Beans	1000	*	50	*	\$6.50	=	\$325,000
Corn	1000	*	150	*	\$2.50	=	<u>\$375,000</u>
							TOTAL = \$700,000

Acres	*	Bu/Acre	*	Price-Cost	=	Profit
1000	*	50	*	(\$6.50-\$5.86)	=	\$32,000
1000	*	150	*	(\$2.50-\$2.48)	=	<u>\$3000</u>
						TOTAL = \$35,000

40/60 Corn and Soybean Rotation

Crop	Acres	*	Bu/Acre	*	Price	=	Gross Revenue
Beans	1000	*	50	*	\$6.50	=	\$325,000
Beans	200	*	45	*	\$6.50	=	\$58,500
Corn	800	*	150	*	\$2.50	=	<u>\$300,000</u>
							TOTAL = \$683,500

Acres	*	Bu/Acre	*	Price-Cost	=	Profit
1000	*	50	*	(\$6.50-\$5.86)	=	\$32,000
200	*	45	*	(\$6.50-\$6.35)	=	\$1350
800	*	150	*	(\$2.50-\$2.48)	=	<u>\$2400</u>
						TOTAL = \$35,750

60/40 Corn and Soybean Rotation

Crop	Acres	*	Bu/Acre	*	Price	=	Gross Revenue
Beans	800	*	50	*	\$6.50	=	\$260,000
Corn	1000	*	150	*	\$2.50	=	\$375,000
Corn	200	*	135	*	\$2.50	=	<u>\$67,500</u>
							TOTAL = \$702,500

Acres	*	Bu/Acre	*	Price-Cost	=	Profit
800	*	50	*	(\$6.50-\$5.86)	=	\$25,600
1000	*	150	*	(\$2.50-\$2.48)	=	\$3000
200	*	135	*	(\$2.50-\$2.91)	=	<u>(\$11,070)</u>
						TOTAL = \$17,530

Based on price and profitability, the decision to plant more soybeans seems to be justified for 1997. However, the additional profit is not significant enough to assume the additional risk plus mess up the crop rotation for 1998. Even with a switch back to a 50/50 rotation in 1998, I would still end up with 20% of the soybean acres on soybean ground.

It appears to me that there is sufficient incentive for those growers with a larger percentage of corn acres to plant more soybeans at current price levels. However, for me to plant 2nd year corn or 2nd year soybeans it is going to take a much greater price incentive to offset the risk. The yields that were used in determining costs per bushel were based on a 10% yield reduction for the second year of a crop. The yield reduction could easily rise to a 15 or 20% reduction under weather or disease stress. Therefore, to switch acres it will realistically take more like a 20% profit margin to insure a reasonable return with the greater risk. So all of a sudden, corn would have to be at \$3.49 or soybeans at \$7.62 with these costs to even consider switching acres.

Under this cost scenario, a bean:corn price ratio range of 1.8:1 to 2.8:1 would have to be exceeded on either end to draw acres of each particular crop. I don't believe the market is ready to provide the incentive needed to switch acres and then do it early enough in the year to provide the opportunity to easily switch. If the market waits till after the Planting Intentions Report in late March, it is basically too late. In a lot of years, field work has already begun with the application of nitrogen and herbicides. Once these two operations are done, it is difficult to change crops. Also, prices probably will not move fast enough in less than a couple of weeks to beat the start of planting. A lot of times the bigger price moves are in current contracts and not in the Nov. or Dec. contracts that the new crop will be priced off in the fall. In the future, if prices are going to attract acres, they will need to do so in January and February, not April.

NEW TECHNOLOGY

There is a lot of new technology being introduced into farming today. The technology is exciting and has potential but also is very intimidating to a lot of farmers. All the computers, equipment, information, designer seeds, and other technology is going to make farming more complicated in the future. Some of the technology will have great payoffs and some will be white elephants. I believe Bt corn has the potential to increase and stabilize our average corn yields. It will not necessarily increase overall yield potential but will protect what is there. The yield loss to corn borers is often hidden, but with Bt corn and yield monitors it will become increasingly evident the extent of the loss each year. A year or two of side-by-side comparisons of Bt vs. Non-Bt corn should prove the advantage of season long ECB control.

Roundup Ready soybeans will not increase yields in the near future, however, they do have the potential to increase profits per acre by reducing costs. The Roundup Ready system has around two bushels per acre increase over other herbicide programs. The genetics of the Roundup Ready varieties is generally a step behind the new elite varieties, so, the gain from the system offsets the lower yield potential. At this point, Roundup Ready will provide comparable yields. The next generation of varieties, four or five years from now, will have the potential to increase overall yields. The Roundup Ready system will also help combat different weed problems. Most of the herbicide tolerant crops will not really impact yields for several years but will provide new management tools for controlling weeds, hopefully, at a cost savings.

Precision farming has the potential to increase yields. How that exactly is going to happen is yet to be fully determined. Yield monitors are documenting the impact of each of our management decisions and practices. Yield monitors make it easier to compare variables side-by-side, such as varieties, plant populations, fertilizer rates, etc..

LIVESTOCK FEED DEMAND

The livestock industry is rapidly changing and increasing in size of operations. The large operations are making a long term commitment to the business and will not be entering and exiting the market like the traditional farmer of the past. As a result, the demand for feed will be

more consistent from year to year. The operations are becoming increasingly sophisticated in their development of rations and adjusting the ration to achieve a consistent protein and amino acid balance. The demand for grains and soybean meal may be influenced more by the quality of the grain available rather than the supply or price, though these operations are also more likely to switch between alternative feed sources.

CHALLENGES ASSOCIATED WITH 1996 FARM BILL

Many people believed with the new farm program, farmers are getting a windfall in new payments. In reality, payments have dropped 30-50% in comparison to the per bushel amount received from 1989-95. However, the timing of \$5 corn with the year with the greatest transition payment have many landlords wanting a piece a piece of the pie, if not all of it. Farmers haven't done themselves any favors either as they have used the transition payment to aggressively bid up cash rents expecting \$4 corn for years to come. Landlords have misunderstood the payments but we as farmers have also done a poor job in communicating that government payments are on the decline for the next seven years.

MISCELLANEOUS COMMENTS

I foresee acreage in the Midwest corn/soybean states becoming more consistent from year to year as many farmers move to a 50/50 crop rotation. A lot of farmers that have never planted soybeans are now beginning to plant beans. The states that have the opportunity to plant four or five different crops are more likely to switch between crops with price outlook. The Mid-south is one area that could increase or decrease corn/soybean acres without negatively impacting their crop rotation. In fact, rotation will have a positive impact on their traditional main crops like cotton. Corn acres in 1996 increased in the South with price prospects plus the new freedom not to have to plant all their cotton base acres. The Midsouth had an excellent weather year for first year corn growers. It will be interesting to see how they react after a poor weather year and how corn yields are affected in their area.

The CRP program has had a positive effect upon the uptrend in yield levels of the major crops. By removing marginal land from production, the low yielding fields have been removed from the total acres. The program has been a positive from an environmental perspective without sacrificing much production. Also, in the stress years, the CRP land would have been more severely impacted in its production bringing down the average yield even more.

The fall of 1996 saw grain bins swept clean in Iowa, a situation that has not been experienced in quite some time. It appears the end-users are following other industries with a just in time production mentality. The question is how are industry and government going to react when we do have a year when supplies get tight? From a farmer's perspective \$5 corn is nice but I think long term it will hurt our demand base both domestically and internationally. The challenge our farm operation has is to stabilize and increase our yields from year to year, improve grain quality, and be the lowest cost producer.

ARE CONSUMERS GETTING WHAT THEY WANT?

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In order for any business to grow, it has to adapt to changes in the tastes and preferences of its customers. For the meat industry, this means changing the characteristics of the raw material -- i.e., livestock. They have to produce what consumers want. The poultry sectors are making this transformation more quickly than either beef or pork, due to a more streamlined industry structure. The key is the ability to pass economic signals from the consumer to the producer, creating economic incentives to alter production practices as consumer preferences change.

What do consumers want? The major trends are pretty well-documented. Consumers want meat products that are easy to prepare; products that taste good; products that look good; products that are relatively inexpensive; and products that are safe to eat.

However, we have to recognize that not all consumers want the same thing. Some are more health-conscious. Some are more taste-conscious. Some are more price-conscious. Processors and retailers are diversifying their product lines to appeal to different segments of their customer base. For example, many retailers who used to sell only one grade of beef are now operating a "two-tiered" program -- they offer both select and choice beef, or select and Certified Angus Beef in the same meat case. The select-grade product permits them to run "hot" features, catering to the price-driven customer, while the choice or premium-grade product caters to the customer who considers taste and tenderness more important than price.

Recent consumer research indicates that an increasing amount of money is being spent for food prepared away from the home. Much of this growth appears to be among take-out restaurants -- not necessarily the traditional fast-food chains, but any place where a customer can make a phone call, pick up their order, take it home, and eat it. This trend has given rise to one of the latest buzzwords in the food industry, the category known as "Home Meal Replacements". People order out primarily because they don't have much time, and because they know what to expect in terms of taste and appearance. Quite likely, they are looking for the same qualities in the meat they buy at the supermarket.

How does the meat industry fit into this profile?

Poultry producers -- especially the chicken industry -- seem to be doing the best job of delivering what consumers want. Chicken companies have managed to expand their output every year since 1975, while maintaining profitability. Improvements in production efficiency have helped make this possible, as well as expansion of export markets. But the dramatic growth that has occurred over the past 20 years would not have been possible if the industry were not focusing on the consumer, and making products which had the qualities people were looking for.

The pork industry probably ranks second in this respect. Pork producers, and the National Pork Producers Council in particular, have made great strides in the last 10 years. Hogs are much leaner and more uniform than they were just 10 years ago. Pork is marketed much differently than it was 10 years ago, with a number of products now being promoted as specific ingredients of specific recipes. NPPC's trademark America's Cut has been successful, one reason being that this product must meet certain specifications in order to be marketed as such. Consequently, every time a consumer buys an America's Cut boneless pork chop, he knows what he's buying. There is still a significant amount of variation in the color and the texture of fresh pork in general, however, and a lot of the fresh pork sold over the retail counter requires a substantial amount of preparation. Thus, there is room for improvement. But the pork producers as a group are well-organized, and they seem to have a consumer-oriented focus. Most importantly, the hog marketing system has evolved into something that should facilitate those consumer-oriented goals. The pricing system is the key.

The beef industry has the farthest to go. To a large extent, retail beef products require some time and effort to prepare. The beef industry has some work to do in the way of marketing and product development. A separate issue, and one that is probably more difficult to address, is the variation in product quality. There is more variation in beef quality and appearance than in either pork or poultry. Generally speaking, when people buy beef, they can't be real confident that they're going to get what they expect. This is true to a certain extent for restaurant customers, and it's especially true for supermarket shoppers. Some of that variation in quality is obvious in the retail meat case display. Within a single display there are typically wide variations in product color, marbling, size, and taste. To the extent that the consumer has to gamble on the taste of the product, demand for beef is reduced.

Is the beef industry delivering what consumers want? Not exactly. Why? In large measure, it's because ranchers and cattle feeders aren't being paid to produce what consumers want, at least not in terms of taste and consistency. It's nobody's fault in particular, it's just a flaw in the pricing system.

Consider the way that fed cattle are bought and sold. On a liveweight basis, many cattle are bought and sold by the pen. If a pen of cattle is estimated to be about 50% USDA choice, that pen will bring a certain price. If the pen is estimated to be 65% choice, it will bring a slightly higher price. But a single price will be paid for the entire pen. In many cases, the packer will pay the same price for a high choice carcass as for a medium select carcass, simply because they are in the same pen. Those two carcasses, after they're boxed up, are going to bring much different

prices in the wholesale market, and will look and taste completely different on somebody's plate. Yet the packer is paying the same price for both of them, because those two cattle are in the same pen.

We talk about how important it is to transmit economic signals from the consumer to the producer. Isn't the signal getting scrambled at this point in the marketing chain?

If a packer is paying one price for a whole pen of cattle, based on the average characteristics of the group, what kind of signal does this send to the cattle feeder? It's not giving him much of an incentive to produce choice cattle, and it's not giving him any incentive to produce cattle that look alike. If I'm a cattle feeder selling cattle this way (by the pen), trying to maximize my profits, I'm going to source feeder cattle that will grow fast and convert feed efficiently. That's what the market is paying me to do.

So then, what kind of signal is the calf producer receiving? The calf producer is controlling the genetic makeup of the entire beef supply. He is being paid only to produce big, healthy calves that will grow fast, and convert feed efficiently.

Fast-gaining and efficient feed-converting cattle are not all bad, because these characteristics help hold down the cost of the final product. However, efficiency in the feedyard may not have much to do with meat quality or uniformity, things that are important in meat merchandising.

True, a fair number of cattle are priced "in the meat", or on a carcass basis, and even among cattle that are priced on a liveweight basis, there are premiums and discounts for USDA yield grade and quality grade. But these premiums and discounts are pretty small compared with the differentials that exist in the beef market.

For example: A packer may buy a pen of cattle and pay \$63/cwt for the whole pen. In that pen there may be a choice yield grade 1 steer, and a select yield grade 3 steer. Under a typical liveweight pricing grid, he will wind up paying \$66/cwt for the choice Y1 steer and \$62/cwt for the select Y3 steer -- a difference of \$4/cwt. Based on the current beef market, however, if both of those carcasses are fabricated into close-trim, the choice Y1 steer is actually worth \$8.48/cwt (on a liveweight basis) more than the select Y3 steer. The value differential in the wholesale beef market is more than twice as large as in the live cattle market.

Calculating those values for each week in 1996, the average difference in value between a choice Y1 and a select Y3 in the close-trim wholesale beef market was \$11.28/cwt live.

This brings up another point. Under the current pricing system for live cattle, it's not economical for the packer to fabricate a yield grade 3 carcass to close-trim specs -- choice or select. He has to cut too much fat off the Y3 carcass to make it work for him. Consequently, the vast majority of close-trim beef is probably coming out of yield grade 1's and 2's, while the yield grade 3's are going into commodity beef. This is limiting the total supply of close-trim beef. It's generally

agreed that it's more economical and more efficient for the trimming to take place in the packing plant as opposed to the back room of a retail store. So it's not surprising that more and more retailers are converting to close-trim beef. Production of close-trim beef increased dramatically over the past several years, a very positive development. But further progress is unlikely until the pricing system for live cattle is changed.

The major point is that the prices paid for live cattle generally don't reflect the value of those cattle in the wholesale meat market. There's not a clear economic signal being passed from the consumer to the producer. That's impediment to delivering what the consumer wants.

Compare this to the hog marketing system. Ten years ago the pork industry had the same problem. But they've changed. It used to be that all hogs brought the same price at the buying station, almost without regard to the type of hogs that were delivered. Under that system, a hog producer was encouraged to produce the cheapest hogs he could, regardless of quality. Today, however, every hog is priced individually, according to carcass weight and lean content. Through this evolution in the pricing system, the pork industry has managed to eliminate the bottom end of the pork supply.

The chicken industry has evolved even further, to the point that there no longer exists a market for live chickens. The people who are making the end product are essentially producing their own birds, albeit under contract. Under this integrated arrangement, with focus being on the end product, the genetic strains of chickens being produced today are not necessarily those which grow the fastest or convert feed most efficiently; they are the strains which have the carcass characteristics which fit the kinds of products that consumers are demanding.

There is a big difference in the marketing systems between poultry, hogs, and cattle, and these differences have a major impact on the ability to transmit economic signals from the consumer to the producer. The beef industry does not lack for a willingness or desire to improve the overall quality and consistency of its product. But in order to get people to change the way they do things, you have to make it worth their while economically. In order for the beef industry to deliver the product that consumers want, cattle must be priced individually, and there will have to be more price discrimination between carcasses, based on the characteristics that are important to consumers -- meat quality and cutability, appearance, and uniformity, among others. Once that's accomplished, we might be surprised at how quickly things will change.

THE COTTON MARKETING CHALLENGE

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Step by slow step the United States cotton grower has gingerly been weaned from the government's involvement in his production decisions. Likewise, the price and income support programs that accompanied such involvement are a part of the past, not the future. The passage in 1996 of the FAIR Act reversed a trend of government involvement in agriculture that had its roots in the era of the Great Depression. With the exception of transition payments that will continue through 2002, the government has removed itself from any direct price or income support program for cotton growers, the CCC loan programs notwithstanding. The withdrawal of federal supports, exposure to global markets and rapid changes in technology (transgenic cotton, etc) all combine to make the future of the U. S. cotton industry difficult to predict.

Some growers foresaw this changing environment and began to hone both their production and marketing risk management skills. Others will follow suit if they are to survive. This new transition brings growers to the very threshold of survival. The new decision environment also requires more grower attention to crop selection, financial risks, machinery and equipment complements, tenure arrangements and access to information.

Thus, growers need accurate and timely outlook information more than ever before. Fortunately, the information revolution has provided the industry with the ability to survey information sources daily. Yet, two age old marketing adages will continue to mark the success of the individual grower. Those are: (1) Know your cost of production and (2) Always be willing to take a profit. Some may try a different twist or add a new spin, but such efforts will be little more than window dressing.

The fundamentals of supply and demand will ultimately determine price. However, cotton growers must be mindful that marketing in this new environment also requires an understanding of all elements of market analysis. There is no substitute for market planning. The removal of a government supported income safety net dictates that marketing become a primary component of every grower's decision making process. The grower has three choices...(1) He can make the time commitment to perform this task for himself, (2) He can hire a consultant capable of providing specific information, or (3) He can contract with a marketing cooperative organization to provide this service. These are his choices, his future.

THE OUTLOOK FOR FOOD PRICES IN 1997

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The Consumer Price Index (CPI) for food in 1996 increased 3.3 percent above 1995. This was the largest increase since 1990, when food was up 5.8 percent. The 1996 food price increase of 3.3 percent was slightly above the 3.0 percent increase for all goods and services.

In 1997, the CPI for food is expected to rise 2 to 4 percent above 1996. The away from home component of the CPI, which increased 2.5 percent in 1996, is expected to increase 2 to 4 percent in 1997. The higher Federal minimum wage, which went into effect fall 1996, had a minimal affect on the away from home index in 1996. While we were expecting some upward pressure in the away from home index, competition among the restaurants and fast-food establishments remained strong and prevented the pass-through of higher wage costs and raw material costs to consumers. The at home component of the CPI, which increased 3.7 percent in 1996, is also expected to increase 2 to 4 percent in 1997.

In spite of higher grain prices in 1996, there were four major factors holding food prices to the 3.3 percent increase. First, inflationary pressures, as measured by changes in the all items CPI, remained stable at 3.0 percent in 1996 and is forecast to increase 3.2 percent in 1997. This means that costs related to food production and marketing, such as labor, packaging, transportation, and advertising which account for about 75 percent of retail food costs, are not expected to increase substantially.

Second, the farm value proportion of the U.S. food dollar, has generally been declining, to about 22 cents in 1995, is expected to be about the same in 1996 and 1997. With a smaller farm value proportion, retail prices are determined less by farm commodity prices and more by market conditions for labor, packaging, and advertising, as well as by competition among firms.

Third, the trend of increasing economies of size in the agricultural sector is expected to continue. In general, larger and more specialized beef, pork, and poultry operations have led to slower rising per-unit production costs.

Fourth, the away-from-home food sector, including purchases primarily from restaurants and fast-food establishments, continues to grow. Purchases of food away from home accounted for 47 percent of total food dollars spent in 1995 and is expected to be about the same in 1996 and 1997. Expansion in this sector tends to lessen the impact of farm commodity price rises on the overall food price index. Changes in prices for away-from-home items are influenced more by developments in the non-farm markets (labor, packaging, transportation, and advertising) and by competition among restaurants and fast-food establishments, than by increases in farm commodity prices. The away-from-home food market has been very competitive since the recession of the

early 1990's.

In summarizing 1996 food price increases, higher grain prices reached during the spring of 1996 affected feed costs as well as retail prices in pork, poultry, eggs, dairy products, and cereal and bakery products. Because these food categories account for over a third of the at-home food dollar, price changes for these items have a significant impact on the at home CPI. Although retail prices increased for most food categories in 1996, prices also fell for three food categories--beef and veal, fresh vegetables, and nonalcoholic beverages.

- **Beef and veal.** Large beef supplies along with weakened export demand provided U.S. consumers with plentiful supplies, with the beef and veal CPI falling 0.3 percent in 1996. However, cow and heifer herd downsizing, which started mid 1995, should affect beef production in second-half 1997. Beef production is expected down 1 percent in 1997, with the CPI for beef and veal expected to increase 1 to 3 percent.
- **Pork.** Retail pork prices increased 9.9 percent in 1996, due to lower pork output, fast-paced exports in the first half of the year, and brisk demand for bacon in the fast-food industry. With 1997 pork production expected to remain near 1996 levels, the CPI for pork is expected to increase 3 to 5 percent in 1997.
- **Other meats** increased 3.6 percent in 1996 and is expected up 1 to 3 percent in 1997. Other meats are highly processed food items with their price change influenced more by the general inflation rate than by the cost of the meat inputs.
- **Poultry.** Continued strength in domestic and export demand along with higher feed prices boosted poultry prices 6.2 percent in 1996. Slower production increases in 1997 for broilers and turkeys, and lower production for total red meat during the first quarter 1997 should contributed to higher broiler prices. The CPI for poultry is expected to increase up to 2 percent in 1997.
- **Fish and seafood.** In 1996, prices for the major fish items--tuna, salmon, and shrimp remained flat. The CPI for fish and seafood went up 0.9 percent in 1996, with an expected 2 to 4 percent increase in 1997.
- **Eggs.** Egg prices were especially volatile in 1996, going up 18.0 percent. Strong domestic demand, especially from the fast-food industry, and foreign demand, kept retail prices higher throughout the year. Continued increases in production during the 4th quarter 1996 and into 1st quarter 1997 should result in 1997 prices averaging below the high levels of 1996. The CPI for eggs in 1997 should show no increase or decrease slightly from 1996 prices.
- **Dairy products.** Strong domestic and export demand for dairy products coupled with lower output increased the milk products CPI 7.0 percent in 1996. Lower milk production in 1996, restrained by high feed prices and forage quality problems,

contributed to the rise in retail prices. Milk production in 1997 is forecast to increase 1 percent from 1996 levels, because of increased demand and lower feed costs. Because of these factors, along with the possibility of lingering damage from the winter storms in the western states of California, Washington, Idaho, and Oregon, the 1997 CPI for dairy products is expected to rise 2 to 4 percent.

- **Fats and oils** increased 2.4 percent in 1996 and is expected to increase a modest 2 to 4 percent in 1997. Since fats and oils are highly processed food items, their price change is influenced more by the general inflation rate than by the cost of the raw commodities--including soybeans, corn, and canola.
- **Fresh vegetables.** The weather and growing conditions in the major fresh vegetables growing areas, especially California, Florida, Arizona, and Texas was almost perfect in 1996. As a result, there were no major disruptions in the fresh vegetables market, with the CPI falling 2.0 percent in 1996. However, 1997 has started out differently, with a severe Florida freeze in January damaging several fresh market vegetables--squash, snap beans, green peppers, eggplant and tomatoes. The impact on retail prices for these items will likely last from February through the end of May. Fresh-market vegetables grown in other states and not affected by the freeze include potatoes, lettuce, onions, celery, broccoli, cauliflower, and cabbage. Although the fresh vegetable CPI is expected to increase 6 to 7 percent the first 6 months of 1997, the annual increase should be less and return to trend levels, at 3 to 5 percent.
- **Fresh fruits.** Early reports from the Florida Citrus Commission indicated that the January 1997 freeze had little impact on the citrus industry. A predicted record U.S. orange crop along with production in apples should moderate the expected 3 to 5 percent increase in the fresh fruit CPI in 1997, after an increase of 7.1 percent in 1996.
- **Sugar and sweets.** Domestic sugar production declined about 7 percent in 1996, as high prices for alternative crops and lower grower returns caused some producers to switch sugar beet acreage to other crops in the spring of 1996. Along with lower sugar output, price increases for high-fructose corn syrup contributed to higher retail prices for selected sugar-related food items in 1996, boosting the CPI 4.5 percent. With total sugar supplies expected up slightly in 1997, the CPI for sugar and sweets is expected to increase 2 to 4 percent in 1997.
- **Cereal and bakery products** account for a large portion of the at home food CPI - almost 15 percent. While higher grain prices contributed to higher retail prices for selected bakery product items, retail price reductions for breakfast cereals tempered gains in the cereal and bakery products CPI to just 3.9 percent in 1996. Most of the costs to produce cereal and bread products are for processing and marketing, more than 90 percent in most cases, leaving the farm ingredients a minor cost consideration. Competition for market share among the three leading breakfast cereal manufacturers led to retail price cuts for four consecutive months in 1996; an example of how the market competition can affect retail prices more than commodity prices. With demand for cereal and bakery

products expected to continue, the CPI for cereals and bakery products is expected to rise at a rate of 3 to 5 percent in 1997.

- **Nonalcoholic beverages.** The CPI for nonalcoholic beverages fell 2.4 percent in 1996 due to retail price reductions for both coffee and carbonated beverages during part or all of the year. Coffee retail prices during the first 8 months of 1996 were down 19 percent compared with the same period the year before. Competition between the leading soft drink companies during the 1996 summer Olympic games led to lower retail prices during the peak demand season, curtailing price gains for the entire year. In 1997, however, the CPI for nonalcoholic beverages will likely increase 2 to 4 percent, due to higher wholesale coffee prices in the world market. Higher wholesale prices have been triggered by a lower than expected crop in Brazil and labor unrest in Columbia, the two major coffee producing countries.
- **Other prepared foods.** Other miscellaneous prepared foods are highly processed and are largely affected by changes in the all-items CPI. However, higher ingredient and raw material prices in 1996 caused some manufacturing price increases in selected prepared foods, boosting the CPI for other prepared foods 3.4 percent in 1996. Competition among products should dampen further retail price increases in 1997, with the other prepared foods CPI expected up 2 to 4 percent.

Changes in Food Price Indicators
1995 through 1997

Items	Relative importance ^{1/}			Forecast 1997	
		1995	Final 1996		
		--Percent--		-----Percent Change-----	
All Food	100.0	2.8	3.3	2 to 4	
Food Away From Home	37.3	2.3	2.5	2 to 4	
Food at Home	62.7	3.3	3.7	2 to 4	
Meats	12.2	0.1	3.5	1 to 3	
Beef and Veal	6.2	-0.8	-0.3	1 to 3	
Pork	3.4	0.7	9.9	3 to 5	
Other Meats	2.5	1.5	3.6	1 to 3	
Poultry	2.7	1.4	6.2	0 to 2	
Fish and Seafood	2.4	4.8	0.9	2 to 4	
Eggs	1.0	5.4	18.0	-4 to 0	
Dairy products	7.4	0.8	7.0	2 to 4	
Fats and Oils	1.6	2.8	2.4	2 to 4	
Fruits and Vegetables	12.7	7.7	3.5	3 to 5	
Fresh Fruits and Vegetables	8.9	10.3	2.8	3 to 5	
Fresh Fruits	4.5	8.8	7.1	3 to 5	
Fresh Vegetables	4.5	12.1	-2.0	3 to 5	
Processed Fruits and Vegetables	3.8	2.2	5.0	2 to 4	
Processed Fruits	2.1	3.1	5.8	2 to 4	
Processed Vegetables	1.6	1.2	4.0	2 to 4	
Sugar and Sweets	2.1	1.7	4.5	2 to 4	
Cereals and Bakery Products	9.2	2.8	3.9	3 to 5	
Nonalcoholic Beverages	5.0	6.9	-2.4	2 to 4	
Other Prepared Foods	6.5	2.4	3.4	2 to 4	

^{1/} BLS estimated expenditure shares.

EVALUATION OF USDA's FORECASTS OF THE CPI FOR FOOD An Initial Assessment

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The U. S. Department of Agriculture forecasts various components of the Consumer Price Index (CPI) for food. The industry uses these forecasts to formulate production and investment strategies; the U.S. Federal Reserve considers them in managing inflationary pressures; government policy makers use them to assess the nutritional impacts on the low income population through food stamp, school lunch, WIC, and other food-related programs. Given these uses and because of the increasing importance of food related issues, USDA began an effort last year to (1) make the forecasting procedures transparent, (2) examine the forecast accuracy and reliability, and (3) assess the potential for improvements.

The USDA began a comprehensive effort last year to examine its food price forecasts. I will report on the initial effort. The initial assessment focused on seven components of the CPI for food that were forecasted using a common procedure. These components are (1) Fish and Seafood, (2) Fats and Oils, (3) Sugar and Sweets, (4) Cereals and Bakery Products, (5) Other Prepared Food, (6) Dairy Products, and (7) Nonalcoholic Beverages. This study evaluates the Economic Research Service (ERS) procedure by comparing its forecasts of the seven CPI series with forecasts from competing models. The analysis was conducted by the Food and Consumer Economics Division (FCED) of the ERS and are explained in detail in a technical bulletin (Denbaly et. al.).

Data

The U.S. Bureau of Labor Statistics gives ERS monthly data on individual components of the food CPI. The data are seasonally unadjusted monthly series from January 1986 through February 1996. Of the seven series forecasted by FCED, all share a pronounced upward trend over the sample period, yet display different patterns.

The prices used to construct the Fish and Seafood component are: canned fish or seafood, fresh or frozen fish and seafood, shellfish, and fish. Between 1986 and 1995, this component rose nearly 48 percent. Despite some volatility around the trend, the trend appears constant and easily identified (figure 1).

The prices used to construct the Dairy Products index are: fresh whole milk, other fresh milk and cream, cheese, ice cream and related products, butter, and other dairy products. The dairy price

Figure 1. Seafood and Fish

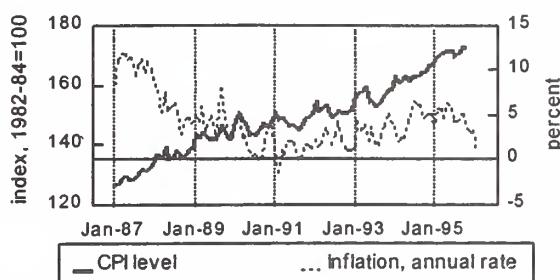


Figure 2. Dairy Products

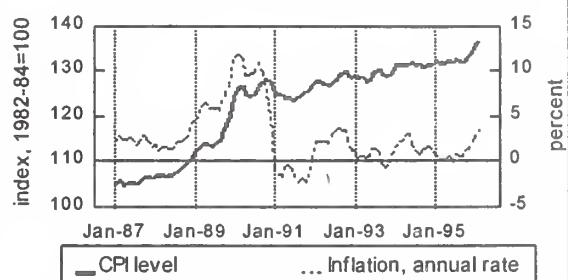


Figure 3. Oils and Fats

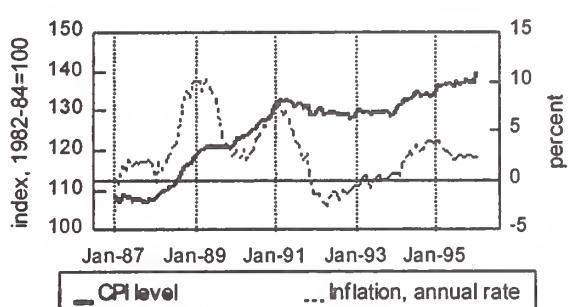


Figure 4. Cereal Products

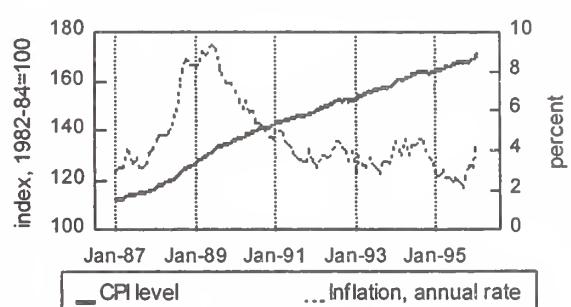


Figure 5. Nonalcoholic Beverage

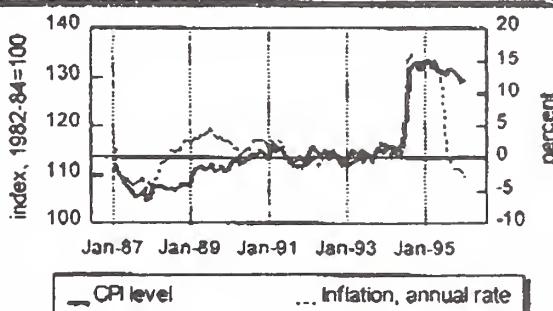


Figure 6. Sweets and Sugar

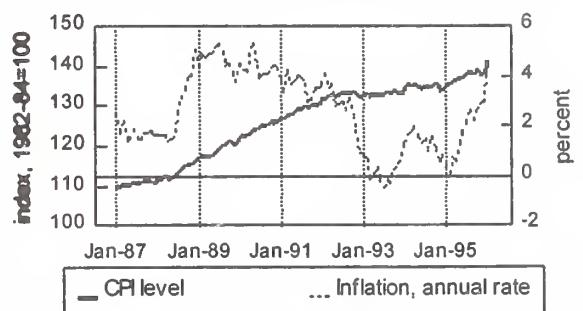
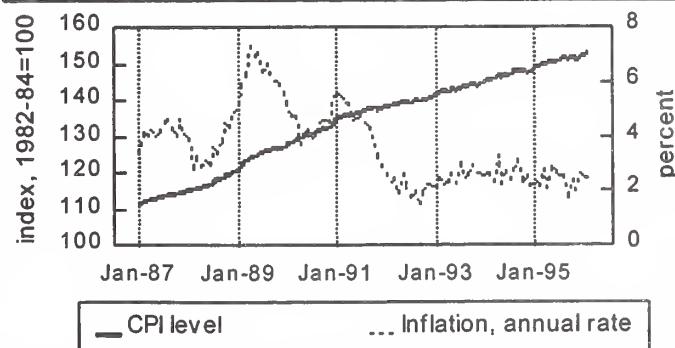


Figure 7. Other Prepared Foods



series increased by 30 percent over the sample period. It increased by 10 percent between 1986 and 1989, by 15 percent in 1990, and increased slightly from 1990 to 1995 (figure 2).

The prices used to construct the Fats and Oils component are: other fats and oils, nondairy cream substitutes, and peanut butter. Between 1986 and 1988, this index displayed no trend. In 1989, the index increases by about 15 percent, and rose by about 10 percent in 1990. The Fats and Oils price index fell slightly between 1991 and 1993 and rose by about 3 percent from 1993 to 1995 (figure 3).

The prices used to construct the Cereal and Bakery Products index are: flour, prepared flour mixes, cereal, rice, macaroni and similar products, and cornmeal. Of the seven component series, this price index rose most over the sample period -- over 50 percent. There appears to be little volatility of the series around a linear trend (figure 4).

Prices used to construct the Nonalcoholic Beverage price index are: cola drinks, carbonated drinks other than cola, coffee, tea, and other noncarbonated drinks. The index rose by 3-4 percent between 1986 and 1994. The sharp 15 percent increase during April and May of 1994 reflected a shortage of coffee caused by a drought and an early frost in Brazil. Following this increase, the Nonalcoholic Beverage price index showed little trend (figure 5).

The prices used to construct the Sugar and Sweets index are: candy and chewing gum, other sweets, and sugar and other sweeteners. The Sugar and Sweets index increased by about 30 percent over 1986-95. From 1988 to 1992 the series closely follows a linear trend. After 1992, the series appears more volatile (figure 6).

The prices used to construct the Other Prepared Foods index are: canned and packaged soup, frozen prepared foods and meals, potato chips and other snacks, nuts, salt and other seasonings and spices, olives, pickles, and relishes, sauces and gravies, other condiments, canned or packaged salads and desserts, baby food, and other canned or packaged prepared foods. This series increased steadily by 41 percent over the sample (figure 7).

While the seven components of the food CPI display a pronounced upward trend over the sample period, each series appears to grow at different rates. The Dairy Products, Fats and Oils, and Sugar and Sweets components display different and more volatile trends in the 1990s than in the 1980s.

Changes in food price patterns between the 1980s and the 1990s occurred amid profound changes in the food industry. In the 1980s, food processors shifted away from mass-produced foodstuffs and toward higher value-added products. Mass media may have helped shift consumers' preferences for convenience, safety, and health attributes of food; and marketers lured shoppers with national brand names such as Nabisco, Campbell, and Kellogg's. The willingness of consumers to pay for these attributes led to sharp increases in the price of

nationally branded food products and to the profits of national-brand food firms. The leveraged buyouts of national firms in the late 1980s represented a demand for more brand names, and the magnitudes of some of the buyouts reflected firms' expectations that more brand names would translate into ever increasing profits.

These expectations were not realized. Since the recession of 1991, more thrifty consumers appeared to dump expensive brands for cheaper store brands. The 1980's price increases among nationally branded food products left national firms vulnerable to less costly competitors. Store-brand processors produced food products of reliably high quality, and marketed their products without the expense of advertising. Adding to the competition among processors was competition among retail outlets. Since the beginning of the 1990's, traditional outlets such as Kroger and Safeway have been challenged by warehouse clubs such as Sam's (Wal-Mart) and Pace (K-Mart). More thrifty and quality-conscious consumers and more intense competition may have flattened price increases in the 1990's.

The FCED Forecasting Procedure

The FCED forecasts the seven CPI series up to 12 months in advance. The procedure has two components: a model based estimate and a subjective adjustment based on the analyst's information about the market. The model component, derived from historical data, accounts for the specific forces and regularities of the market in question. While the subjective adjustment includes the effects of current and future events that the analysts is aware of and that historical data do not account for their influences. The initial evaluation focused on the model components.

The model assumes that the annual proportionate change in a series follows a random walk. That is, the annual growth rate of last month's CPI (relative to the same month a year ago) is the rate that projects any CPI between the two months into the future.

To clarify, Table 1 illustrates how the model component was derived in January 1995 for Seafood and Fish. First, the ratio (CPI in December 1994 / the CPI in December 1993) was calculated, 1.05 percent. [Note that in any given month the most current CPI information is the CPI in the last month.] Then, this ratio was multiplied by CPIs for January 94 through December 1994 to obtain twelve CPI forecasts, for January 1995 through December 1995. In February, the CPI for January 1995 was released. Then, the ratio was recalculated as (CPI in January 1995 / CPI in January 1994); and, eleven forecasts for February 1995 through December 1995, were obtained by multiplying this ratio by the CPIs for February 1994 through December 1994.

Note that in each month forecasting ends in December. Therefore, the number of forecasts in each month declines by one. This means that each year there is 1 forecast for January CPI, 2 forecasts for February CPI,..., and 12 forecasts for December CPI. That is each year there are 12

Table 1. Operation of the Procedure

Months	Data History	Ratio	1/95 forecasts	2/95 forecasts	3/95 forecasts	...	12/95 forecasts
Dec-93	158.7	--	--	--	--	--	--
Jan-94	163.2	--	--	--	--	--	--
Feb-94	160.9	--	--	--	--	--	--
Mar-94	161.8	--	--	--	--	--	--
Apr-94	163.7	--	--	--	--	--	--
May-94	161.6	--	--	--	--	--	--
Jun-94	162.6	--	--	--	--	--	--
Jul-94	163.2	--	--	--	--	--	--
Aug-94	163.6	--	--	--	--	--	--
Sep-94	164.9	--	--	--	--	--	--
Oct-94	164.8	--	--	--	--	--	--
Nov-94	167	--	--	--	--	--	--
Dec-94	166.9	--	--	--	--	--	--
Jan-95	169	1.05	171.63	...	...	...	...
Feb-95	170.4	1.04	169.21	166.62	...	...	...
Mar-95	171.2	1.06	170.16	167.55	171.35	...	...
Apr-95	171.6	1.06	172.16	169.52	173.37	...	...
May-95	171.9	1.05	169.95	167.34	171.14	...	...
Jun-95	172.1	1.06	171.00	168.38	172.20	...	...
Jul-95	170.4	1.06	171.63	169.00	172.84	...	...
Aug-95	170.9	1.04	172.05	169.41	173.26	...	...
Sep-95	173.5	1.04	173.42	170.76	174.64	...	...
Oct-95	173.3	1.05	173.32	170.66	174.53	...	...
Nov-95	172.9	1.05	175.63	172.94	176.86	...	...
Dec-95	172.1	1.04	175.52	172.83	176.75	...	172.80

one-month-ahead forecasts (one for each month), 11 two-months-ahead forecasts (February-December)..etc.

An Alternative Model

One advantage of using the above model is its simplicity. Another advantage is that large amounts of historical data are not needed to construct a forecast. But, does this simplicity come at the cost of being inaccurate? Can we improve the forecasts by using slightly more complicated procedures?

There are many forecasting alternatives. They can be divided broadly into: (1) statistical models with constant parameters, and (2) statistical models with time-varying parameters.

To choose an alternative, we limited the search to the class of constant parameters and, more specifically, to time-series type models. The choice is motivated by the relative ease of estimating and use of time-series models and because the FCED model is itself a restricted time-series model with constant parameters.

The Economic Time Series (ETS) procedure in SAS was used to identify an alternative candidate that best fits the observations from January 1986 to July 1990. Observations from January 1986 to February 1996 were used to measure the model's forecast performance.

ETS identified an identical model, which included seasonal dummies, for all price series but dairy. (See Denbaly et. al. for details.)

Comparison of Forecast Accuracy

Out-of-sample forecasts obtained from the alternative models were used to examine forecast reliability. The evaluated forecasts were out-of-sample in the sense that samples used to estimate the model were different from the periods for which forecasts were calculated.

First, the parameters of the alternative models were estimated using the January 1986-July 1990 observations. Then, based on the parameter estimates, forecasts for the August 1990-July 1991 period were computed. The FCED predictions for the same period were also computed as described above. Next, the August 1990 observation was added, and parameter estimates for the alternative models were recompute using the January 1986 to August 1990 data. The revised parameter estimates were used to forecast the September 1990-August 1991 observations. Note that the new set of FCED forecasts required no re-estimation. This process was repeated until the March 1995 observation, when forecasts were limited to 11 months ahead. In each succeeding update, the forecast horizons were reduced by 1 month until the January 1996 observation was added to the sample, and a single forecast was generated for February 1996. This procedure resulted in 67 one-month-ahead forecasts, 66 two-months-ahead forecasts, 65 three-month-ahead forecasts, and so forth to 56 twelve-months-ahead forecasts.

Five measures were used to compare the alternatives to the FCED's. First, forecast errors were calculated by subtracting the forecasts from actual CPIs. Then, the errors were divided by actual observations to obtain forecast errors as a percentage of the observed CPI. This measure, called the relative forecast error, calculated for the alternative models was consistently lower than the relative errors of the FCED models across the seven series.

Second, for 1, 2, 6, and 12 month forecast horizons, and each of the seven CPI categories, the errors were summed and divided by the number of available forecasts. This indicator, called mean error (ME), measures how close the average value of a forecast for a particular horizon is to the average value of the observations. Table 2 reports results. All MEs are small. For Fish

and Seafood, the 1-month ME value of the FCED model, -0.011, is in absolute value smaller than the ME value for the alternative -0.143. This is the case for many other MEs. However, the ME measures forecast bias, and negative forecast errors offset positive forecast errors. Therefore, a better measure is to recalculate the ME using the absolute forecast error values. This measure, called the mean absolute error (MAE) is always positive. Table 3, reports that all MAEs, except two, are smaller for the alternative model. In addition, if a ME value is roughly the same magnitude as a MAE value, systematic forecast bias maybe suspected. Both the FCED and alternative models generate forecasts with generally small bias, and the differing magnitudes of the MAE statistic suggest no significant systematic bias.

Another measure of comparison is the reliability of the forecasts. That is, the wider is the range of possible forecasts for a model, the less reliable is the forecast. Two alternative indicators can be used to assess reliability: mean absolute percentage error (MAPE) and root mean squared errors (RMSE). The MAPE is calculated by summing the absolute values of the relative forecast errors and dividing it by the number of available forecasts. The RMSE is calculated by taking the square root of the sum of the squared forecast errors and dividing it by the number of available forecasts.

Table 4 and 5 report the results. The MAPE associated with the 1-month forecast of the Fish and Seafood series is 0.988 for the FCED model and 0.697 for the alternative model. Except in one case, the MAPE and RMSE are smaller for the alternative models, suggesting they are more reliable.

Conclusions

It is important to remember that the FCED forecasts are made of a model-based component and a subjective adjustment; and, that the evaluation only addressed the model component. Based on this evaluation the FCED models have been revised. In generating the alternative models' forecasts, estimates of the correlation of the time series are revised as new information becomes available. Because the FCED model is not based on estimates of statistical correlation, new data does not lead to better parameter estimates and to, presumably, better forecasts. What is surprising is how well the FCED model performs despite this limitation.

Table 2. Mean Error Forecast Comparison (8/90 to 2/96)

	Month-Ahead Forecast							
	1		2		6		12	
	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.
Fish & Seafood	-0.011	-0.143	0.054	-0.248	0.237	-0.616	0.965	-0.797
Dairy	-0.113	0.059	-0.274	0.138	-0.758	0.439	-0.695	1.300
Fats & Oils	-0.042	-0.165	-0.090	-0.284	-0.426	-0.904	-1.044	-1.443
Cereals & Bakery	-0.033	-0.063	-0.057	-0.137	-0.265	-0.485	-0.632	-1.050
Non Alcohol	-0.109	0.055	-0.246	0.111	-0.730	0.534	0.175	1.726
Sugar & Sweets	0.008	-0.059	0.015	-0.120	-0.119	-0.508	-0.462	-1.251
Other Prep.	-0.032	-0.098	-0.067	-0.190	-0.293	-0.623	-0.699	-1.347

Table 3. Mean Absolute Error Comparison (8/90 to 2/96)

	Month-Ahead Forecast							
	1		2		6		12	
	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.
Fish & Seafood	1.553	1.101	2.112	1.609	2.035	1.994	2.683	2.656
Dairy	0.836	0.552	1.416	0.917	2.926	1.865	3.745	2.420
Fats & Oils	0.699	1.000	1.008	1.280	2.236	1.726	3.785	2.198
Cereals & Bakery	0.502	0.388	0.650	0.443	1.047	0.785	1.510	1.237
Non Alcohol	1.161	0.820	1.882	1.307	4.757	3.013	7.368	5.075
Sugar & Sweets	0.488	0.370	0.669	0.511	1.354	1.046	2.002	1.773
Other Prep.	0.505	0.354	0.499	0.377	0.863	0.826	1.290	1.473

Table 4. Mean Absolute Percent Error Comparison (8/90 to 2/96)

	Month-Ahead Forecast							
	1		2		6		12	
	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.
Fish & Seafood	0.988	0.697	1.342	1.020	1.276	1.267	1.667	1.687
Dairy	0.649	0.426	1.100	0.707	2.287	1.444	2.916	1.868*
Fats & Oils	0.532	0.503	0.766	0.689	1.695	1.462	2.874	1.896*
Cereals & Bakery	0.319	0.248	0.414	0.284	0.661	0.500	0.949	0.783*
Non Alcohol	0.947	0.674	1.511	1.057	3.750	2.386	5.769	3.981*
Sugar & Sweets	0.365	0.277	0.499	0.382	1.004	0.780	1.483	1.319*
Other Prep.	0.351	0.248	0.350	0.264	0.608	0.578	0.907*	1.000

Table 5. Root Mean Squared Error Comparison (8/90 to 2/96)

	Month-Ahead Forecast							
	1		2		6		12	
	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.
Fish & Seafood	1.939	1.412	2.548	1.920	2.568	2.389	3.045	3.130
Dairy	1.192	0.682	2.125	1.133	4.370	2.341	5.274	2.759
Fats & Oils	0.910	0.822	1.336	1.062	2.994	2.090	4.888	2.676
Cereals & Bakery	0.620	0.504	0.766	0.542	1.265	0.868	1.678	0.960
Non Alcohol	2.199	1.464	3.846	2.620	7.944	5.349	10.71	7.345
Sugar & Sweets	0.598	0.489	0.831	0.662	1.649	1.198	2.457	1.815
Other Prep.	0.610	0.418	0.609	0.445	1.101	0.728	1.679	0.863

CONSUMER PRICE INDEX OVERSTATES FOOD PRICE INFLATION

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The Consumer Price Index (CPI) has long been criticized by academic and government analysts on the grounds that inherent biases in the index lead to substantial overestimates of changes in the cost of living, and corresponding underestimates of growth in real incomes and productivity. The matter began to receive close media and political scrutiny in January of 1995, when Federal Reserve Board chairman Alan Greenspan informed the Budget Committees of Congress that "the official CPI may be overstating the increase in the true cost of living by perhaps 1/2 to 1 and 1/2 percent per year..." and that that overstatement led to large increases in government expenditures in indexed entitlement programs. He suggested that reductions in CPI bias could eliminate the federal deficit.

The Senate Finance Committee assembled an Advisory Commission to study the Consumer Price Index, commonly referred to as the "Boskin Commission" after its chair, Professor Michael Boskin from Stanford University (other members were Ellen Dulberger from IBM, Zvi Griliches from Harvard, Robert Gordon from Northwestern, and Dale Jorgenson from Harvard). The Commission issued a final report ("Toward a More Accurate Measure of the Cost of Living") on December 4, 1996. That report contains the Commission's best estimate of CPI overstatement (1.1 percentage points per year), an assessment of the several sources of bias, and a summary of the likely implications of CPI overstatement.

The Commission's report, and much of the surrounding discussion, emphasizes the difficulty of accounting for new products and changes in product quality in the CPI. The focus of that discussion has been on sectors, such as consumer electronics, automobiles, and medical care, that have a lot of innovation and technological change. That emphasis misses an important point: the likely CPI bias in the food at home sector is high (about 1.9 percentage points per year), and can be fixed more readily than problems stemming from innovation in rapidly growing sectors.

Table 1 summarizes the best estimates of CPI overstatement for the overall CPI as well as the components for food at home and food away from home. It breaks the overall bias down into the four sources used by the Boskin Commission. The estimates for the overall CPI are taken from the Boskin Commission's final report, and the estimates for new product/quality change bias in food sectors are also the Commission's estimates. Estimates for the other three bias categories in food at home and food away from home are ERS estimates based on review of considerable research performed by academic and government economists.

The Commission's best estimate of bias in the overall CPI is 1.1% per year, and more than half of that is due to problems in handling new product and quality change. The ERS estimate of overstatement in the Food at Home CPI is substantially higher, 1.9% per year, and more than half of that is due to another source of bias--Lower Level Substitution Bias. Estimates of bias in the Food Away from Home CPI are substantially lower.

The underlying research, most of it done by economists at the agency that produces the CPI (The Bureau of Labor Statistics), suggests that lower level substitution bias has been a serious problem for the food at home CPI since 1978, leading to substantial overstatement of food price inflation for nearly two decades. The BLS recently introduced some procedural changes that will reduce the effect of this bias, and further feasible procedural changes could eliminate it.

One source of bias (Upper Level Substitution Bias) is a well known staple of economics textbooks, and another (New Product/Quality Bias) has been an important and longstanding focus in economic research. But two others (Lower Level Substitution Bias, and Outlet Substitution Bias) are less well known. The latter two are particularly important in the food sector, and in fact the evidence on them is almost entirely based on analyses of the food sector. In order to clearly understand each of the four it's important to first understand how the CPI is constructed.

CPI Construction

The CPI is constructed in two stages, and the key to understanding CPI biases is to understand how items are selected for pricing and how their price changes are aggregated at the two stages into an index.

At the upper stage of index aggregation, a monthly CPI is built up from 44 geographic categories (such as the Atlanta metropolitan area) and 207 product categories (such as Apples, or White Bread), which are combined to form 9,108 price indexes, one for each "strata" of an item and geographic category. In order to aggregate these strata indexes into the overall CPI and its components (such as Food at Home), the BLS uses information on household expenditure patterns from the Consumer Expenditure Survey to develop weights applied to the strata indexes and components. The current weights were introduced to the CPI in 1987 and are based on expenditures over 1982-84 (a three year time span is used to expand sample size and thereby reduce sampling errors in the estimated weights). New weights from 1993-95 Surveys will be introduced in 1998.

At the disaggregated stage, separate strata indexes are calculated for each product category in each geographic category using representative samples of outlets and item prices. Outlets are selected using a Point of Purchase Survey (POPS), in which households are asked about the outlets at which they purchased goods and services. The results are used to select outlets for pricing, with the probability of selection proportional to expenditure shares as revealed in a

POPS. Data collectors then go to the selected outlets and select specific items for pricing (such as Red Delicious apples, or a 5 lb. bag of Gold Medal All-Purpose flour). Specific items are selected randomly, with the probability of selection driven by the item's share of an product category's (Apples, Flour) sales in an outlet. Since this procedure means that different items (Red Delicious vs. Rome apples) could be priced in different outlets, the samples become less useful for comparing levels of prices. Rather, the index aims to aggregate relative price changes.

Because buying patterns are infrequently surveyed at upper levels of the CPI, the weights assigned to upper level components, such as Apples, Fresh Fruit, Fruits and Vegetables, and Food at Home, are kept fixed for extended periods of time. But because Point of Purchase Surveys are done in 20% of the CPI sample each year, the CPI keeps up with changes in buying patterns at lower levels, among outlets and within product categories.

How do we go from price collectors to the CPI? First, BLS personnel construct price relatives (the ratio of this month's price to last) for each priced item. Lower level aggregation is done by calculating the simple arithmetic mean of the price relatives for specific item varieties. That is, each strata index is simply the average of price relatives across sample outlets and items in that strata. Since outlets and items are selected with probability proportional to sales, this is equivalent to weighting price changes at outlets by sales. Upper level indexes are formed by weighting component item strata indexes by the fixed weights derived from the relevant Consumer Expenditure Survey. Each substitution bias is based on specific problems that arise at these aggregation stages.

Upper Level Substitution Bias

"Upper Level" bias is the traditional textbook substitution bias of a Laspeyres index, and arises because the CPI maintains fixed weights calculated at the beginning of the comparison period. Using fixed weights that are dated create two problems. First, as consumer expenditure patterns change, the old set of weights become less relevant as measures of the price changes faced by representative consumers; the current CPI assumes that food at home occupies the same share of household budgets that it did in 1982-84, when we know that food's budget share has clearly declined. But Upper Level Substitution Bias actually refers to a related and more systematic problem. Some product categories have had relatively high price increases since 1982-84; for example, prices for fresh and frozen fish rose by about 99% between 1982-84 and 1996, while prices for beef rose by 38%, according to the CPI indexes for each. Consequently, some people will shift away from fish and toward beef because beef became relatively less expensive; but the CPI is constructed on an assumption that purchase patterns are unchanged. In brief, the index will systematically overstate the weights that consumers place on products that are rising quite rapidly in price, while understating the weights that consumers place on products whose prices are not rising as rapidly.

The BLS has done a lot of research on this sort of bias; it can be evaluated retrospectively by reweighting the index with later Consumer Expenditure Survey data. Estimates of the effect

cluster in a range of .10 to .30, depending on the products evaluated. Table 1 cites the Commission's estimate for the overall measure, while the number for food at home is taken from published research. Food at Home is larger because consumers are more likely to substitute among food at home categories in response to price changes. The term "Upper Level" means that this bias refers to substitution among product categories (Apples or Bananas) and not to substitution among items and outlets within those strata.

Lower Level Substitution Bias

Recall how recorded price changes at outlets are aggregated to the strata level: simple averages of price relatives. This formulation can create a serious bias, an "inflationary drift" that is not necessarily about substitution. Suppose iceberg lettuce is priced at two outlets: price rises from \$1.00 to \$1.50 in one, and falls from \$1.50 to \$1.00 in the other. The two price relatives are 1.5 and .67, and the mean price relative is 1.085, an 8.5% "average" price increase. Suppose prices reverse again in the following month. The index will record another 8.5% average price increase, even though average prices have been unchanged for two months. The problem is particularly important for products with substantial month to month or outlet to outlet variation in price changes, and is particularly important for fresh fruits and vegetables (where CPI bias is on the order of 3.0 to 5.0% annually) and also for fresh meats.

BLS procedures also introduced a subtle spurious correlation between price changes of outlets newly introduced into the sample and their (implicit) weights. The nature of the POPS means that outlets about to raise prices were more likely to be introduced into the CPI sample, and outlets about to cut prices were less likely to be introduced. The BLS recognized this problem in 1994, and changed procedures in January of 1995 in order to deal with this problem. The agency estimates that the changes, which it calls "seasoning", will remove 0.4% from lower level substitution bias in the CPI for food at home; looking forward, then, Lower Level Substitution Bias in the food at home CPI should be 0.7% per year and the all sources bias for food at home is estimated to be 1.5% per year.

A simple adjustment can remove the rest of the Lower Level Substitution Bias. If, rather than average the price relatives (1.5 and .67 in the example above), BLS instead averaged the natural logs of the price relatives (+.4005 and -.4005), the drift would be eliminated. BLS has generated experimental indexes based on this approach of calculating geometric rather than arithmetic means, and has found that the Food at Home CPI would be reduced by a further 0.7%, if seasoning was also retained. Because the problems seem to arise in the formulas used to aggregate price changes at lower levels of the index, the BLS refers to this source of bias as "Formula Bias".

Lower Level Substitution, or Formula, Bias can be quite large for products whose price changes fluctuate widely over time or across outlets. In particular, the CPI for fresh fruits and vegetables has probably been dramatically overstated; BLS research suggests that the simple formula adjustment outlined above would reduce the growth in the CPI for fresh fruits and vegetables by

4.50% per year. Other research finds estimates of overstatement in the range of 3.0-5.0% per year for that category. Nonfood prices are more stable, so the overall effect is estimated to be less. Because Away from Home prices are also more stable, and therefore the adjustment would have a smaller effect on Away from Home.

Outlet Substitution Bias

Ongoing POPs surveys lead to sample "refreshment", with about 1/5th of the index's outlets being newly drawn each year. BLS research has shown that newly entering food outlets have prices that average about 1.25% below the prices of exiting outlets. At present, this price difference is not included in CPI calculations. If replacement is occurring in January, for example, then the CPI will include a November to December price relative for the old outlet in the December CPI, and a December to January price relative for the new outlet in the January CPI. In other words, the CPI only includes price changes within outlets, and excludes price differences across outlets.

Current BLS procedure assumes that any outlet price differences reflect corresponding unobserved quality differences that are "paid for" by the price difference (estimated price differences can be based on the December overlap in the above example). Commission, BLS, and popular commentary on the Boskin Report seems to accept the BLS assumption at face value, by assuming that the source of this price difference is warehouse stores and Walmart (what the *Economist* calls "Americans' predilection for shopping at discount stores").

The BLS procedure is actually the correct one to follow, and there is therefore no bias, if new outlets do offer lower quality and fewer services, and if the price difference between outlets reflects that. The index shouldn't record poorer service as if it were a price decline for comparable services. But much of the shift in patronage in the last decade is toward larger food stores that offer lower prices and greater quality, in the sense of greater breadth of product line and more services, achieved through realization of scale economies offered by high sales volumes. If that's true, then outlet price differences should be included in the CPI.

If outlet price differences were included in the index, the Food at Home CPI would likely have grown about 0.25% less per year over the last decade (see table 1). Because all of the research refers to grocery outlets, the Boskin Commission reduced that estimate for the overall CPI. Table 1 keeps their reduction for Food Away from Home, but I think that truth is likely to be closer to zero, because we haven't seen the same sort of structural change in outlet sizes that we've seen in food retailing. Moreover, this estimate is actually backward-looking; that is, it is based on the dramatic changes in retailing of the last decade and a half. It will not hold for the future if structural change toward larger and lower priced food stores does not continue.

New Product/Quality Change Bias

This is conceptually similar to outlet substitution bias. Suppose a new, higher quality television is introduced to the market, and further suppose that it is introduced into the CPI in January. The December CPI will include the November-December price relative of the old models that are

rotating out of the sample. The January CPI will include the December-January price relative of the new model. In short, the index will only measure price changes within models, and will ignore any quality gains. Of course, many new consumer electronic models offer lower prices and higher quality than old models, and the index will generally ignore cross model price reductions.

In some cases, the quality improvement will occur for an existing model (this year's version of the existing television model is better). In that case, BLS may continue pricing the model, and if higher quality comes at a higher price, the increased price will be entered into the index, but not the value of increased quality.

A related problem concerns the timing of new product introduction to the CPI. Many new product prices fall sharply early in the product's life cycle, and later stabilize and begin to rise relative to other products. The BLS's well known lags in introducing new product categories to the index (the current example being cellular phones) means that products early in their life cycle (with falling prices) are underrepresented in the index.

A considerable amount of research, much of it by Commission members, has gone into this topic, with most of it focussed on electronics, appliances, automobiles, pharmaceuticals, and medical care. The research finds that these effects can be very large, and the Commission's report assigns more than half of the overall CPI bias to this source. The Commission also asserts that the effect of the CPI for Food is overstated by 0.3% annually because of this bias, but their evidence is entirely speculative. There is at present virtually no reliable evidence on the existence or extent of this bias for food products.

What is Likely to Happen?

The Boskin Commission Report makes a variety of recommendations to the BLS, to Congress, and to professional economists. The BLS has provided a detailed set of responses to the report, available at the agency's website. Some are feasible immediately, and some may become feasible. Some of the feasible recommendations are likely to be implemented, but some are not because they are expensive or because they are conceptually controversial.

The BLS could reduce or eliminate Lower Level Substitution Bias at little cost by replacing the lowest level price arithmetic mean price relatives with geometric means. The existing method violates some basic standards for an adequate price index and the new way would not fundamentally alter the CPI at upper levels. Moreover, the BLS is already producing an experimental index based on geometric means. For those reasons, this is the most likely change. If carried out it will have an important impact on the Food At Home CPI, reducing it by 0.70% annually and reducing growth in the fresh fruits and vegetables component by considerably more. These changes are in addition to the effects of the "seasoning" changes introduced in January of 1995, which appears to reduce the growth in the food at home CPI by 0.40% per year. Taken together, those two changes would have a major impact on estimates of food price inflation, and the bias should have a major impact on how we view measured food price inflation since the late 1970's.

The BLS could also easily adjust the index at little cost to take account of outlet substitution bias, as defined above. The change would have a modest (0.25%) effect on the CPI for Food at Home, but we don't know if it is really appropriate to introduce outlet price differences, and the introduction would open up a wide range of related issues on product quality. Because this step is so conceptually controversial, I don't expect it to happen, and I'm not convinced that it should.

The BLS could retrospectively adjust the CPI for Upper Level Substitution Bias with expanded Consumer Expenditure Surveys. That would require some new substantial funding, and the new index would appear late, 18-24 months after the corresponding CPI. This step is feasible and extra expense is not exorbitant. Nevertheless, it is far from certain because it would require additional funding, it would require an important conceptual shift in what the index aims to measure, and it would be reported with a fairly long lag.

Quality biases are often very difficult to handle. The BLS does frequently make procedural adjustments to handle quality change issues, and these changes have had a large aggregate effect on the index. But in many cases, analysts don't have a strong theoretical framework to guide them and don't have the reliable data needed to apply the theory that is there. As a result, major and far-reaching changes are not likely to happen, and any change that would affect food is both infeasible and unlikely to be implemented.

In conclusion, likely future changes in CPI construction could reduce the CPI for Food at Home by 0.70%, in addition to the 0.40% reduction caused by shifts in BLS procedures in early 1995. I should also caution you that most of the evidence for these estimates is based on BLS experiments over short time periods; the estimates may therefore have a wide margin of error for economic environments different from the recent past.

Table 1: Estimates of Annual Average Biases in Consumer Price Index.

Type of Bias	CPI Component		
	Overall	Food at Home	Food Away from Home
Upper Level Substitution	0.15	0.25	0.10
Lower Level Substitution	0.25	1.10	0.10
Outlet Substitution	0.10	0.25	0.10
New Product/Quality Change	0.60	0.30	0.30
All Types	1.10%	1.90%	0.60%

Sources: All estimates for the Overall CPI, and the New Product/Quality Change estimates for other components: Advisory Commission to Study the Consumer Price Index (The "Boskin Commission"), "Toward a More Accurate Measure of the Cost Of Living", Final Report to the U.S. Senate Finance Committee, December, 1996. All other estimates are ERS estimates based on review of existing research.

THE CHOICES FACING THE EUROPEAN COMMUNITY IN THE LIGHT OF THE PROGRESS TOWARDS MORE OPEN MARKETS

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At the Singapore W.T.O. meeting last December, Trade Ministers agreed that before negotiations begin at the end of 1999 on the next steps of agricultural trade reform, the W.T.O. Agriculture Committee should complete an important work programme. This programme is to analyse the application of the existing agreement to help all participants to define their negotiating positions for the next stage of the agreement. Meantime, the OECD is also starting a work programme designed to analyse the effects of member countries agricultural policy measures.

I don't know how either body will go about their task. I hope, however, that both bodies will not limit themselves to checking compliance with the existing rules - although compliance is certainly a key part of the W.T.O. Agriculture Committee mandate - and that they will also help us all to learn lessons from the effects of the policies which have been applied to ensure compliance with the current Agreement.

I hope that this work will genuinely serve the purpose assigned to it by W.T.O. Ministers - to help W.T.O. members to prepare their negotiating positions. This implies that detailed negotiating positions should not be defined in advance of this process. Indeed, if all participants decide in advance what they must obtain from the next negotiation before they have analysed the consequences of the last one, then the risk that no one will succeed in their objectives must be great.

The topic you have invited me to address today - the options facing the Community in a more open trading environment - covers the experience we are gaining of the current trading environment, which is certainly more open than that which existed in the past. It also invites me to speculate about the options we will face after the next stage of the W.T.O. process.

What I intend to do is to explore the history behind, and experience of, our current policies and try to derive from this some key conclusions for the future.

In 1992, the Community adopted an agricultural reform which was generally regarded as representing the biggest co-ordinated change of policy since the Common Agricultural Policy was introduced in the 1960s. In 1994 the Uruguay Round was completed and included for the first time a comprehensive Agreement on Agriculture. This dealt not only with trade mechanisms but also with domestic agricultural policies.

These two events were, of course, connected. The policy debates within the Community which eventually led to the 1992 reform began when Community policy makers were deciding on their

position for the final stage of the Uruguay Round, which was due to end in December 1990. And the outcome of the 1992 reform was a policy for the Community which could form one of the elements of a package GATT decision on domestic policies. Furthermore it provided a mechanism which, on the basis of the best forecasts, would enable the Community to fulfil its commitment to limit subsidised exports of cereals.

It would, however, be wrong to think that the only, or even the primary, motivation for Community Agriculture Ministers to adopt the 1992 reform was the prospect of an early GATT agreement. Indeed, at the time it was adopted the GATT negotiation appeared to be going nowhere, after the set back of 1990. The vital motor for the 1992 reform was disillusionment with the policies which the Community had been following up to that point, particularly its policy in the cereals sector.

That policy had its roots in a Budget crisis which had occurred five years earlier. In 1987 the Community's agricultural policy and, at the heart of that policy, its cereal policy, was in deep trouble. The attempts the Commission had made at the end of the 1960s to curb cereal support prices had collapsed in the market euphoria of the early 1970s, when the Club of Rome was forecasting imminent shortages of all basic commodities and when world markets rose to dizzy heights which seemed to confirm that analysis. The efforts at the early 1980's to reduce prices and to limit the growth in the Agricultural budget had failed. As a consequence, the cost of the policy exceeded the financial resources the Community was committed to provide.

A central part of the deal struck in 1988 to increase these resources was a comprehensive programme of measures to curb output of the major CAP commodities. For cereals, this involved a combination of producer levies and automatic and cumulative price cuts of 3% per year triggered each time an output limit of 160 m tonnes was exceeded.

Given the political sensitivity of price cuts, a voluntary set aside policy was introduced, which some saw as a means of avoiding the need for price cuts and others as a means of making price cuts more effective.

As early as 1990 this policy came under severe criticism. Sure price cuts had been made. Sure this had helped to cut expenditure - with support prices far above world prices every three percent reduction in intervention prices reduced refund expenditure by nearly double that percentage. But not much land seemed to have gone into set aside, and what land had gone in seemed to have come from somewhere else, because the cereals area didn't seem to be going down.

Worse, production didn't seem to be going down, as politicians thought economists had said it would do. Serious, and otherwise perfectly normal and rational, people began to say that when you reduce prices, farmers produce more in order to try to maintain their incomes. I don't myself believe this. I've never met a serious economist who believes in backward sloping supply curves, with output inversely linked to price. But I do believe, and the Community's experience at the end of the 1980's confirms this, that if you try to control production of all major products by cutting support prices in some sectors and imposing quotas in others, the main impact of the price cuts is not on production. Relative price changes are quite effective as a means of moving pro-

duction from one sector to another. But pressure on all major commodities tends to have its main impact first on incomes and then on the so called fixed costs.

In other words, first all farmers become poorer and more discontented. Then labour inputs are reduced and land costs (be they land prices, rents or taxes on land) start to fall. Economists might see all this as a desirable improvement in efficiency and competitiveness. But farmers, who risk losing both income and - if they own their land - wealth, can't be expected to enjoy it. More generally, when the process starts to accelerate excessively the process of structural change - or to put this economic jargon into concrete terms, when ever increasing numbers of farmers leave agriculture or become part time - the population generally became uneasy. Even largely urban countries with only a tiny share of their active work force engaged in agriculture see in their rural areas the essence of their national identities. When change in the countryside become unbearably fast, the whole nation feels uneasy.

The 1992 reform sought to cure the key defects of the 1988 policy. Cereals prices were cut much more drastically - by around 30% over three years - but farmers were compensated with aids decoupled from current production. So the beneficial effect on consumption; and - to the extent that this happens at all - on supply, of price cuts would be achieved without damage to incomes, employment and land values. At the same time the ineffective voluntary set aside scheme was replaced by set aside as a condition of receiving compensation for price cuts. So almost all farmers (except very small ones, who were exempted) would participate in set aside, thereby making a bigger contribution to output reduction than they would simply as a result of the price signals. This programme was elegant politically as well as economically. Community Agriculture Ministers tend to belong to one of two apparently irreconcilable schools of thought. One school holds that the best course for Community Agriculture is to make - over time and at a bearable pace - the structural adaptations necessary to enable it to compete aggressively on world markets. The other that Community Agriculture should retain its distinctive "traditional" character, relying on prices which are adequate to sustain its traditional cost structure, sustained by import protection and output restrictions.

The 1992 reform offered something to both points of view. But both had to accept compromise. Both sides, therefore, wanted certain reassurances. Those whose instincts lay in expansion and competitiveness wanted to be reassured that the Community's efforts to contain production would be matched by that of other trading partners. If you in the U.S. noticed this, you no doubt find this to be somewhat presumptuous, as you had been operating a competing set aside scheme for decades!

Those whose instincts were with traditional agriculture wanted reassurance that the compensatory aids would be permanent and would not be phased out.

Both agreed that production restraints pre supposed adequate protection against imports. The first few years experience of the new policy surpassed the most optimistic expectations. Production fell. Consumption increased. Stocks were reduced from over 30m tonnes to near zero. Market prices initially followed support prices down but then stopped falling when a balanced market made support unnecessary. Naturally, therefore, incomes rose. And with world prices

rising too, a good part of the cost of the compensatory aids was offset by the reduction and finally elimination of export refunds. The first year's experience of W.T.O. export limits in the Cereals sector was totally painless. Only about 10% of our GATT limit on subsidised exports of wheat and wheat flower was exported with refunds: Only 30% of coarse grain limit was exported with refunds.

On top of all this, over the period of the application of the 1992 reform it has been possible to reduce gradually the rate of obligatory set aside from its initial rate of 15% to 12½ then to 10%. Finally, at the time of maximum euphoria over the need to supply ever tighter world markets, it was decided that the rate for 1996/97 - that is the rate which will affect the 1997 harvest - should be 5%.

All almost to good to be true. And certainly not all due to the change of policy. The initial reduction in cereal production was certainly largely due to set aside. But more recently the greatest influence has been adverse weather conditions, particularly in the South of the Community. Fertiliser use certainly fell, but the change can largely be attributed to set aside. We don't yet have conclusive evidence that the cut in prices on its own has led to less intensive production and less output.

Some researcher would say that this was due to the fact that the change in the balance of the market meant that prices didn't fall as far as was intended. Others would say that far bigger price cuts would be needed before it paid producers to use less fertiliser than the technical optimum.

However, this may be, the 1996 crop looks to have been over 200m tonnes, a very sharp increase from the figure of about 175m of the previous year. This extra production is partly due to the relatively low level of obligatory set aside. But the main reason for the increase in production is a surge in yields. This extra production is available at the same time as production elsewhere in the world has also been recovering and at the same time as the Community's Agricultural budget has been put under new strain, in particular because of the effects on the beef market of B.S.E.

So, although export refunds have been re-introduced to enable Community exporters to follow the downward movement of world prices, we have neither the budgetary resources nor the intention of provoking a price war. In these circumstances it will be difficult to increase export volumes So a significant rebuilding of intervention stocks by the end of the current season seems inevitable.

This then is the economic background against which Community Agriculture Ministers should begin this year to reflect the agricultural policy for the next decade. The Commission has yet to present precise proposals. But it has given broad indications. In an "Alternative Strategies" paper presented to Community Heads of Government in 1996 it said that, whilst existing policies were adequate for the moment, they would not serve as a basis for enlargement of the Community to encompass the Eastern Europe countries - which, in total will increase the Community's arable area by 55% and its population by only 29% - nor to meet the challenge of the next stage of the W.T.O. To meet these challenges the Commission has suggested that prices should be further reduced with compensation; but not necessarily with compensation calculated in the same way as

in 1992. More recently, a major conference in Cork reached broad consensus on the need for an integrated rural policy which recognised that the rural economy could no longer be sustained simply through agricultural support.

Some in the Community are suggesting even more radical changes. David Naish, the President of the Community Farmers Association - (but I have to add, speaking in his capacity as President of the English farmers) has been arguing strongly for a liberalised policy with less support and the end of production restrictions in Europe, just as you have ended them over here.

But arguments within the Community is not all in the same direction. I spoke earlier of the long standing division between the relatively liberal expansionist Ministers and those Ministers who believe that the key objective is to maintain traditional farm structures supported by remunerative prices, production restraint and import protection. This second school of thought has powerful arguments to make too. To compete on world markets without refunds would require, in several sectors and in particular milk, drastic price reductions. Such reductions, they argue, would be catastrophic for the existing generation of farmers and for the existing structure of Agriculture unless it was accompanied by massive compensatory payments. The Farm Budget will be hitting its limits in 1997 and again in 1998, even on existing policies. Governments are not going to find the budgetary resources to increase these limits when they are all struggling to meet the strict budgetary conditions for participation in Monetary Union. So drastic policy change, they argue, is out of the question for the foreseeable future.

I cannot today predict what concrete proposals the Commission will advance to try to reconcile these very different views. Indeed, I think that the process of debate will have to advance some way before any proposal could sensibly be made. Instead, what I should like to do is to draw some broad conclusions from the lessons of our recent history.

First, I am convinced that even large price cuts across the board would not lead to major reductions in Community output. Sure they would change the structure of Community agriculture but they would not drive us off world markets.

Second, provided compensatory aids are decoupled from current output, as is already very largely the case with the cereal aid introduced in 1992, the main impact of such aids is to protect farm incomes, farm structure and land values not to sustain output.

Third - as a consequence of the first two conclusions - the presence or absence of direct output control measures is more important than overall price policy in determining output.

Fourth, as was recognised in the preliminary papers which led to the 1992 reform, production control devices only make sense if there is an adequate level of import protection and they are difficult to defend unless other major players also have protection controls.

This brings me to my major conclusion. In an open trading environment, Community producers have, in reality no choice but to be present on world markets. Paradoxical though it may seem, the only circumstance in which there would be a possible option for the Community to withdraw

from world markets would be if the process of trade liberalisation went into reverse. In that situation - and only in that situation - the Community could, if it chose, pursue a high price/low output programme, behind strong import barriers. Whether such a policy would be acceptable to farmers or would command the necessary majority amongst Agriculture Ministers is another question.